Page 6

Atari Users Magazine

Issue 20

£1

BLOCKBREAKER
a super new game

GRAPHICS WORKSHOP
design your own masterpieces

TOUCH TABLET UTILITIES
enhance your art



ST SECTION
lots of software reviewed

BUMPER GRAPHICS ISSUE

THE CHART TOPPING FLIGHT SIMULATION NOW ON ATARI

FIGHTER PILOT

ALSO AVAILABLE ON 48K SPECTRUM, CBM64 & AMSTRAD

FREE COLOUR POSTER AVAILABLE WITH DISK VERSION

BY D.K. MARSHALL
ADAPTED BY NIK SEN

ATARI

400/800/600 XL
800 XL/130 XE
WITH AT LEAST 48K.



ATARI		
Fighter Pilot Disk		☐ £12.95
Fighter Pilot		☐ £9.95
SPECTRUM		
Tomahawk	48K	☐ £9.95
Night Gunner	48K	☐ £6.95
Fighter Pilot	48K	☐ £7.95
COMMODORE 64		
Speed King Disk		☐ £12.95
Speed King Cassette		☐ £9.95
Fighter Pilot Disk		☐ £14.95
Fighter Pilot Cassette		☐ £9.95
AMSTRAD CPC 464, 664, 6128		
Fighter Pilot		☐ £8.95
Fighter Pilot Disk		☐ £13.95

Cheques payable to Digital Integration Ltd

I enclose a cheque/P.O. for ____________ Total

Name ____________

Address ____________

Please debit my Access/Visa card no.

Expiry date ____________

Tele Sales (0276) 684959

VAT and p. & p. inclusive within UK (Overseas inc. 55p. per cassette)

Please send to

DIGITAL INTEGRATION

Watchmoor Trade Centre,
Watchmoor Road,
Camberley, Surrey
GU15 3AJ

Trade and Export enquiries welcome. Lifetime Guarantee.

Crash Readers Awards 1984 Winner

PAGE 6 Atari Users Magazine

DIAL-A-SUB
Not a subscriber yet?
Just dial 0785 213928 and pay by ACCESS.

March/April 1986

Editor & Publisher
Les Ellingham

Correspondence
PAGE 6 Magazine
P.O.Box 54
Stafford
ST16 1DR

Editorial and Advertising
0785 213928

Printed by
Stafford Reprographics Ltd.
0785 3533

Typeset by
Budget Typesetting Ltd.
0634 41878

PAGE 6 is published bi-monthly

PAGE 6 is a user's magazine and relies entirely on readers' support in submitting articles and programs. The aim is to explore ATARI computing through the exchange of information and knowledge. We will endeavour to pay for articles and programs where appropriate and we hope that you will gain satisfaction from seeing your work published. In turn we hope that you will learn from articles submitted by other readers. All published material is eligible for awards in the Annual Readers' Poll and may receive additional Editorial awards as announced from time to time in the magazine.

Subscription rates annual (6 issues)

U.K.	£7.00
Europe	£10.50
Elsewhere - Surface	£10.50
Elsewhere - Air Mail	£16.00

Single copies and back issues at one-sixth of the annual rates

Disk Subscriptions:

U.K.	£30.00
Europe	£37.50
Elsewhere	Please enquire

Please make cheques payable to PAGE 6.

Copy date for the next issue is 17th March. Publication date is 1st May 1986

Editorial

ST - YOUR FUTURE?

A few people wrote in after the last issue complaining that we devoted too much space to the ST. Understandable comment perhaps from those who have no intention (at the moment) of buying an ST, but stop a minute and consider. *The ST is your future*. In more ways than one. Let's face it, Atari were in grave danger last year of sinking without trace and they needed new products which would make the world sit up and take notice. Those products had to be products of the future and the future of home and personal computers will be firmly based on 16-bit machines. Maybe not for a number of years, but it will come. Jack Tramiel has done a remarkable job in making people sit up and take notice and can now push Atari forward in both the 16 bit *and* 8 bit markets. Without the ST there may have been no company to push forward, so in one sense supporting the ST means continuing support of the existing machines. There is another side though. All the publicity surrounding the ST has made the public and the trade, particularly, more aware of the Atari name with the result that many companies who have never produced software for Atari are being tempted to dip their toe in the water. Some of these are releasing only ST software but there are others who are new to the 8 bit market and who are bringing out some excellent titles. It is doubtful if these companies would have been interested if Atari had maintained its low profile of the past couple of years. There is a third way in which the ST represents your future. If you become interested in programming you will undoubtedly want to delve deeper into the capabilities of your machine. You may want to learn machine language and eventually you may seek new challenges. At that time you will be drawn to the greater power of 16 bit machines and the ST will be the next logical step.

Just as you may, at the moment, turn past more complex articles, turn past the ST pages if you want to, but one day you may buy that ST and then you will be glad of all that reading from past issues. In the meantime there is plenty more in each issue for everybody. Don't worry, we won't desert you!

THANK YOU ... THANK YOU

I must say thank you to everyone who put kind remarks on the Survey form with the last issue. The 'Comments' section was intended to allow you to comment on what you thought was good or bad about the magazine but I was astonished at how many of you just put down, in many different ways, how much you enjoyed the magazine. The most popular request was that we go monthly but it is a very big step to take and there are still many tens of thousands of owners out there who don't know about us. Spread the word, if enough people get to know about PAGE 6 who knows what might happen!

L.T. Ellis

News

NEW ATARI HELPLINE

Atari have announced a new Midlands and Northern HELPLINE to supplement the existing southern based number. The new HELPLINE number is 021 327 2616 and it will be manned by an experienced user of both 8-bit and 16-bit systems. If you require any assistance, whether technical or otherwise, the HELPLINE operative will be able to provide an answer or refer you to the appropriate source.

The existing Southern HELPLINE will continue on 01 309 7770.

STAR RAIDERS II

It really is on its way! Although based on a previously unreleased game called The Last Starfighter, Atari have apparently changed that game considerably to make a sequel to Star Raiders. Several improvements include a starfield that responds to the joystick, new space stations and a tactical display. STAR RAIDERS II is said to be available very soon but at a price.

NEW PERIPHERALS?

There were rumours that Atari would launch new peripherals for the 8-bit computers at CES in LAS VEGAS but they failed to materialise. According to an Atari spokesman though several products will be launched at the HANOVER FAIR in April.

Included are said to be an 80 column interface, a 3½" disk drive and 'possibly' a new 8-bit computer. The 3½" drive is expected to be a single sided 325K drive with access time about twice as fast as the 1050. DOS 2 and 2.5 files are said to be upwardly compatible to this drive. Let's wait and see.

MAJOR NEW SOFTWARE COMPANY

Just at a time when many of the major American software companies are abandoning the 8-bit market to seek new fortunes with the ST, comes an announcement from Software Express Computer Systems Ltd of a major new software publishing house that will have Atari 8-bit products at the forefront.

The new company, Software Express Computer Systems Ltd, (S.E.C.S. for short), is a collaboration between Software Express, already widely known and respected for their retail and distribution of Atari products, and Jon Dean formerly of Atari UK. Jon Dean has been a long time Atari enthusiast and believes he can now do more to keep the Atari market alive and well with the new company. He states "I realise the potential that exists for Atari 8-bit products, let alone 16-bit, and I left Atari believing I could do more for Atari from outside than from within". The company intend to introduce a whole new range of Atari products but one key point of their strategy is to ensure that the software is at realistic prices. Many new owners were attracted to the 800XL because of its price and in Jon Dean's words "have more of a bargain than they realise". The key to realising the potential of the Atari for all new owners is to ensure that good quality software is widely available at all prices starting as low as £2.99.

Another area which the company will concentrate on is PEX which stands for Program EXchange. Many existing owners will recognise the similarity of name to APX which was run by Atari in the States. The idea of PEX is to give ordinary home users the opportunity to have their programs marketed worldwide by a company capable of handling the production and distribution. Many of these programs will be of a specialist nature that most other software companies would not be interested in but Jon Dean recognises that quite often the best new ideas and approaches often come from home programmers. The company hope to evaluate all types of software submitted from ordinary users and will work closely with authors whose programs show potential to help bring them to the market place.

As well as producing their own titles, S.E.C.S. will agree licensing rights with both U.K. and American companies. Smaller U.K. based companies will have the opportunity to have their software distributed by a major company thus overcoming many of the difficulties faced by small companies in a large market. Several companies have already been signed up and the first products will be launched at the forthcoming Atari Computer Show in London.

The company have already made an impact in the United States with its first launch at the CES Show in Las Vegas. Another of the company's directors, Jerry Howells, who attended the show pronounced the company launch a "complete success" with several licensing deals agreed and guaranteed U.S. distribution for all S.E.C.S. software.

The company will produce software for all computers but with the Directors' background rooted firmly with Atari, Atari software will be at the forefront. In the meantime, if you have a program that you feel has sales potential, Jon Dean would like to hear from you. Programs, with supporting documentation, should be submitted direct to Jon Dean, S.E.C.S., 6, Callow Croft, Burbage, Wiltshire, SN8 3TB.

ANOTHER NEW COMPANY

Another company new to Atari products is Gremlin Graphics. The company believe that ATARI will have a big impact this year and have released two new titles, ZONE X and KING OF THE RING. ZONE X has 3 levels and over 300 screens in which the player has to 'make safe' plutonium waste whilst avoiding the usual adversaries. KING OF THE RING is a boxing game in which you can take your fighter to the world championship. Makes a change from karate!

ST – YOUR VIEWS

In the Editorial for Issue 18 I invited readers to share their thoughts on how the ST would affect the existing Atari community. Here is a selection from some of the letters received..

From Cpl John O'Halloran in BFPO 47 ....

"I have been an Atari enthusiast since 1982 when I bought my trusty old 800 and have slowly but surely delved deeper into the mysteries of the machine. Whilst not professing to be anything but a poor amateur I feel inclined to say that to the best of my knowledge there is still not an 8-bit machine to match the flexibility of my 800. My only disappointment has been in the sound capabilities and I was looking forward to the ST just to see the machine's capabilities in the sound department (Not much better than the 8-bit! Ed.).

Unfortunately I cannot see myself upgrading to an ST because, quite honestly, I believe it is going to be a full blown business machine. If however a 260ST comes out and Atari aim that more towards the home market, I may think again."

Paul Carfoot from Burton-on-Trent expresses concern that Atari may find themselves in the same position with the ST as they did with the 8-bit machine - lack of public awareness .....

"Although the ST is available through specialist dealers to those who already know, I have yet to see an ST in any of the multiple stores where most new customers do their shopping. Indeed I went into the computer department of a large multiple chain to ask about the ST and the assistant had never heard of it! Although Atari might have the edge now with an advanced machine, it will not be long before the opposition catch up and with companies such as Amstrad having a much higher profile in the high street Atari might find themselves in trouble.

Will I buy an ST? Probably yes, but I am being cautious to see how the market develops. I don't want to be left with a business only machine although I don't think that will happen."

Mike Doyle from Loughborough remains to be convinced ...

"I agree very much with what you say. The old 'pioneering' era of the early 400/800 days is past, although I feel that, given continued support, the 130XE will fulfil the needs of the average (and discerning!) home user for a long time yet. I use my 130XE for membership and publicity records for a drama group, word processing and home record-keeping, as well as all those marvellous games.

But what about the 520ST? I bought my first 400 four years ago. What persuaded me to buy it was one game - you guessed it, Star Raiders! I was mesmerised by it, but I have yet to see any software for the ST which brings back that feeling. I am not knocking the ST, its specification is great but I want to see a machine like the rumoured 260ST at a price that will make it a 'people's computer' and thus persuade software houses to support it. The ST's deserve to succeed but I am waiting to see if the 260ST serves my needs. If the 260ST or an equivalent machine does not arrive, Atari will be making a big mistake, they have the opportunity to bridge the gap between business and home users. The ST's will do both jobs but I will not buy one until Atari can persuade me that they really want to get ST's into the HOME and will provide or encourage the necessary software support at the right price."

Chris Darkes, who wrote Grand Prix published in issue 18, is already committed! ...

"Yes, I have bought one. I bought it for the 80 column display and GEM environment and of course to have the powerful 68000 processor to play around with. I intend to write games, home finance and a few business programs for my own use.

I also saw the mass of business software at the PCW show and very little of the things that will show the real power of this superb machine as would good arcade games. Let's face it, computers are used for business and the ST will be ideally suited but I will use mine 90% of the time for games. Although my ST will be doing some business, the main aim is to play and write games. I bought it out of my own pocket with the knowledge that the Atari 800 has served me well for five years and is good for another two. If the ST does likewise I shall be very happy. I think that the business fraternity will be surprised how many people have already purchased and will purchase an ST to have, at home, a powerful personal computer to play games."

Allan Palmer from Basingstoke commented more generally ...

"You made some interesting comments on the arrival of the ST series in your editorial. I must admit that I've felt slightly worried that the new ATARI might be moving away from the infamous range of 8-bit micros which the 400 and 800 started in 1979/80, however, with a wide base in the US and elsewhere and the range of software available, I would be surprised if the 8-bit range didn't remain viable for a while longer. From what I've seen, I'm impressed by the ST's but I imagine it will be a while before I acquire one. The main difference between the launches of the ST and the 400/800 in the UK is that when the 400/800 was launched in this country, there was already a wide range of software available due to the UK launch being at least a year after the U.S. This time, there is a whole different ball game...."

From Steve Pedler, who wrote the excellent series on Display Lists for PAGE 6 ....

"Let me say first of all that I would love to own one, and if I had the means would buy one like a shot! I bought my Atari 800 in October 1983 and the only thing I have regretted is that I didn't buy

Letters continued

it earlier. In particular, I would have liked to have owned an Atari in 1980 or 1981 when everything about it was new, when by simply playing around you could discover something that nobody else had yet found. The ST is at the same stage now, and I would dearly love to be in on the ground floor when users begin to get to grips with the machine. There is, however, another side to this. For the past few months I have felt that I am really beginning to know the 800, my decision to learn 6502 assembly language stems from this. If I now switched to the ST, I doubt that I would ever become as expert with the 8-bit machines as I would like.

If I decide to stay with the 800 (at least for another year or two) what are the prospects that Atari (and more importantly, perhaps, the third party software houses) will continue to support these machines? Although I have occasional doubts, reason tells me that such prospects are good. For one thing, there are many, many Atari owners, both in the U.K. and worldwide and hopefully there will be considerably more in 1986. Secondly, there will, I think, continue to be a significant market for 8-bit hardware, at least for another 5 - 10 years. Not everyone can afford an ST or its equivalent. 8-bit machines are cheaper, easier to understand and at present are far more attractive to the dedicated video games player. Clearly, the market will slim down. In two years from now, I believe that there will only be 2 or 3 manufacturers of 8-bit systems (Atari, Commodore and, maybe, Amstrad) so I don't think that owners of 8-bit Ataris have any cause for concern for the next few years. The market for hardware and software is simply too big to be ignored."

And what about the Editor's view after having had a 520ST for several months? Well, I have hardly scratched the surface, but I am astonished by the variety and quality of the software already released. The ST will run business applications extremely well although it does require the OS in ROM, but equally it will run games of a quality that none of you have seen before. Already there are games which show that the ST will be in a whole league above the 8-bit machines and this is only early days. It is an incredible machine. On the other hand it is expensive, too expensive for the majority of 'non-dedicated' potential home computer buyers and for those who want to program it is complex. Writing good programs on the 8-bit machines is relatively easy (easy?) but you will not find it so with the ST. One of the problems that the ST faces is that the software it can run is so diverse, no one yet knows what will be the most popular application. We shall see. In the meantime PAGE 6 will continue to support Atari in all forms according to our readers wishes. ●

ATARI SHOW

In early March the Novotel Hotel in London will be the stage for the first ATARI COMPUTER SHOW, an event long overdue and eagerly awaited by all Atari owners. The show runs from 7th to 9th March and is open from 10 a.m. to 6 p.m. except for the Sunday when it closes at 5 p.m.

The show has the 'official' backing of Atari who will ensure that software developers will be there in force. Atari themselves will have a large stand showing the entire product range and are expected to provide the first U.K. showing of the 1040ST. There are several other new products in the pipeline but at the time of writing, Rob Harding, U.K.'s Products Manager was unable to confirm which of these will be shown. Atari do however consider this to be an important show and Jack Tramiel himself will be attending.

The major difference between the ATARI SHOW and PCW is that this time there will be plenty to actually buy. As well as companies showing their own products, there will be several retailers selling everything from software to blank disks and accessories. This will be an ideal opportunity to see, and buy, some of the software you may have read about.

One of the major attractions will be the launch of the new software company S.E.C.S. showing several new products for the 8-bit machines and their associate company Software Express from whom many items of software, imported and home produced, will be available for purchase. Other retailers at the show include Baz Computers, Datascape, Software Plus and, of course, Silica Shop who will have a large stand.

Blank disks, tapes and accessories will available at bargain prices from Compumart, who are also noted for their keen hardware prices, as well as Zone Four and Direct Disk Supplies.

Hardware and interfacing will be well represented with 2-bit systems launching their new Sound Sampler and Intergalactic Robots showing various computer controlled devices.

Among companies showing new software for the Atari will be C.D.S. who will introduce Steve Davis Snooker along with a range of budget titles under the Blue Ribbon label. These will retail at just £2.50 each or five titles on one disk for £9.95. They are titles already well established on the BBC. For the ST, Computer Concepts will introduce the first ROM based software, FAST ST BASIC which is based on BBC BASIC. Computer Concepts are well known for a range of ROM based software for the BBC.

Many other exhibitors will include companies showing printers, books, bargain software, tools and accessories and more. And, of course, you are most welcome to come along to the PAGE 6 stand!

The first ATARI COMPUTER SHOW looks like an event not to be missed. Organisers Database Publications report having already sold 'thousands' of advance tickets for this long overdue show. Let's hope that it will be the first of many.

LADBROKE COMPUTING INTERNATIONAL for ATARI

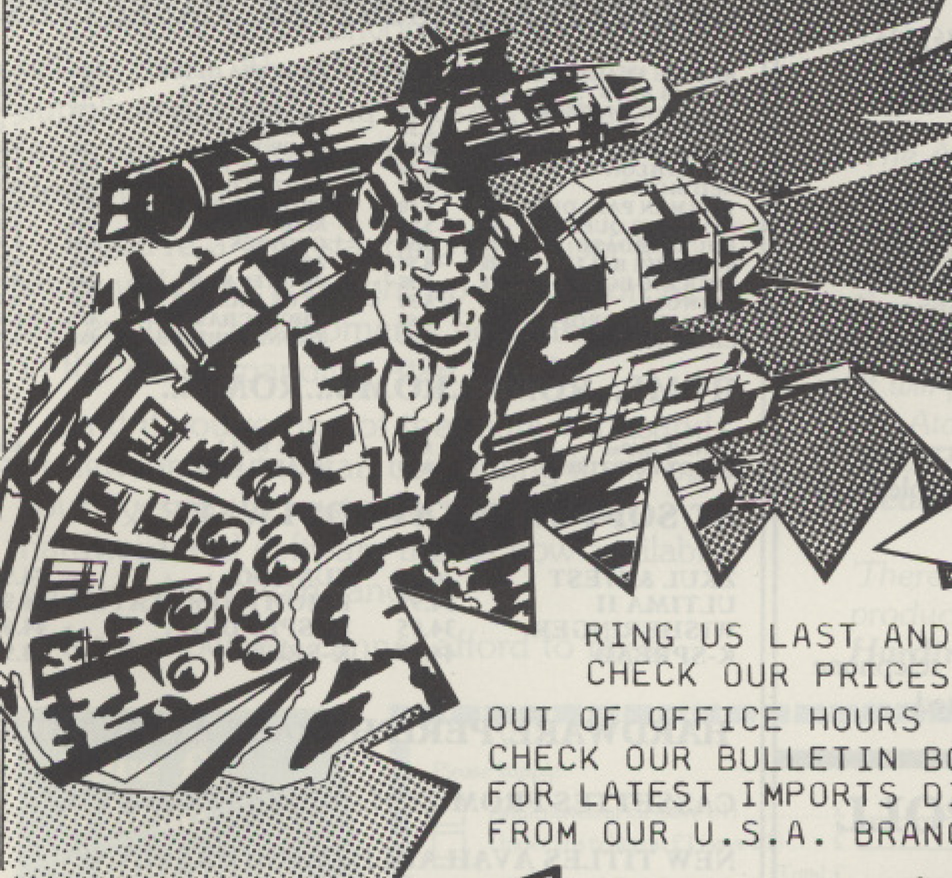
DIRECT AMERICAN IMPORTS FROM OUR U.S.A. BRANCH
PLUS
BULLETIN BOARD WITH PUBLIC DOMAIN DOWNLOAD SOFTWARE

HARDWARE

FULL XL RANGE
130 X E's
512 ST's
EPSON PRINTERS
INTERFACES
MODEMS
FULL SUPPORTING PERIPHERALS
FULL SERVICE SUPPORT ETC.

SOFTWARE

IF IT'S AVAILABLE
WE HAVE IT!!!
ARCADE
ADVENTURES
EDUCATIONAL
UTILITIES
ALL LATEST TITLES



ALL DEDICATED MAGAZINES
IN STOCK
PAGE 6, ATARI USER,
ANTIC, ANALOG.

RING US LAST AND
CHECK OUR PRICES

OUT OF OFFICE HOURS
CHECK OUR BULLETIN BOARD
FOR LATEST IMPORTS DIRECT
FROM OUR U.S.A. BRANCH

33, ORMSKIRK ROAD
PRESTON
LANCASHIRE
PR1 2QP
TEL: (0772) 21474

MAIL ORDER .... (0772) 27236 · 10:00am – 6:00pm
BULLETIN BOARD · · (0772) 27236 · 6:00pm – 9:00am

VISA & ACCESS WELCOME

UPDATE

GRAND PRIX (ISSUE 18): Several readers had problems in running a cassette version of Grand Prix due to a couple of errors in the load and save routines. In BOTH the Cassette Loader and Saver routines the figure 39936 in line 30 should be amended to 39935.

Additional points which may help are to slightly amend the procedure for making a cassette. Follow the instructions on page 33 but add - Step 4a. Type NEW (RETURN) - Step 5a. Type NEW (RETURN) and Step 6a. Switch off and re-boot.

Following these procedures you should have no problems. The main listing is fully correct.

BERTIE (ISSUE 18): The instructions for cassette were not clear. The second listing should be saved immediately after the first by using SAVE "C:". If you then change the CLOAD in line 150 to RUN "C:" the second program will load and run automatically.

Jason Halpin from Ireland suggested the following amendment. Use CSAVE for the second listing as normal and change line 150 of Listing 1 to

```
150 RESTORE 190: FOR I=1536 TO 1554: READ A:
POKE I,A: NEXT I: POKE 764,12: A=USR(1536)
```

and add lines 190 to 192

```
190 DATA 162,253,154,169,183,72,169
191 DATA 84,72,169,4,32,182,187,169
192 DATA 255,76,4,187
```

Listing 2 will then run from the title without any further action.

BLITZ (ISSUE 18): Mr Goodbody from Harrow wrote to point out that the attract mode was not disabled and suggested amending line 1000 to:

```
1000 BOMB=1: BCH=0: POKE 77,0
```

LIVINGSTON BBS (ISSUE 18): The telephone number should be 0506 38526 and not as stated.

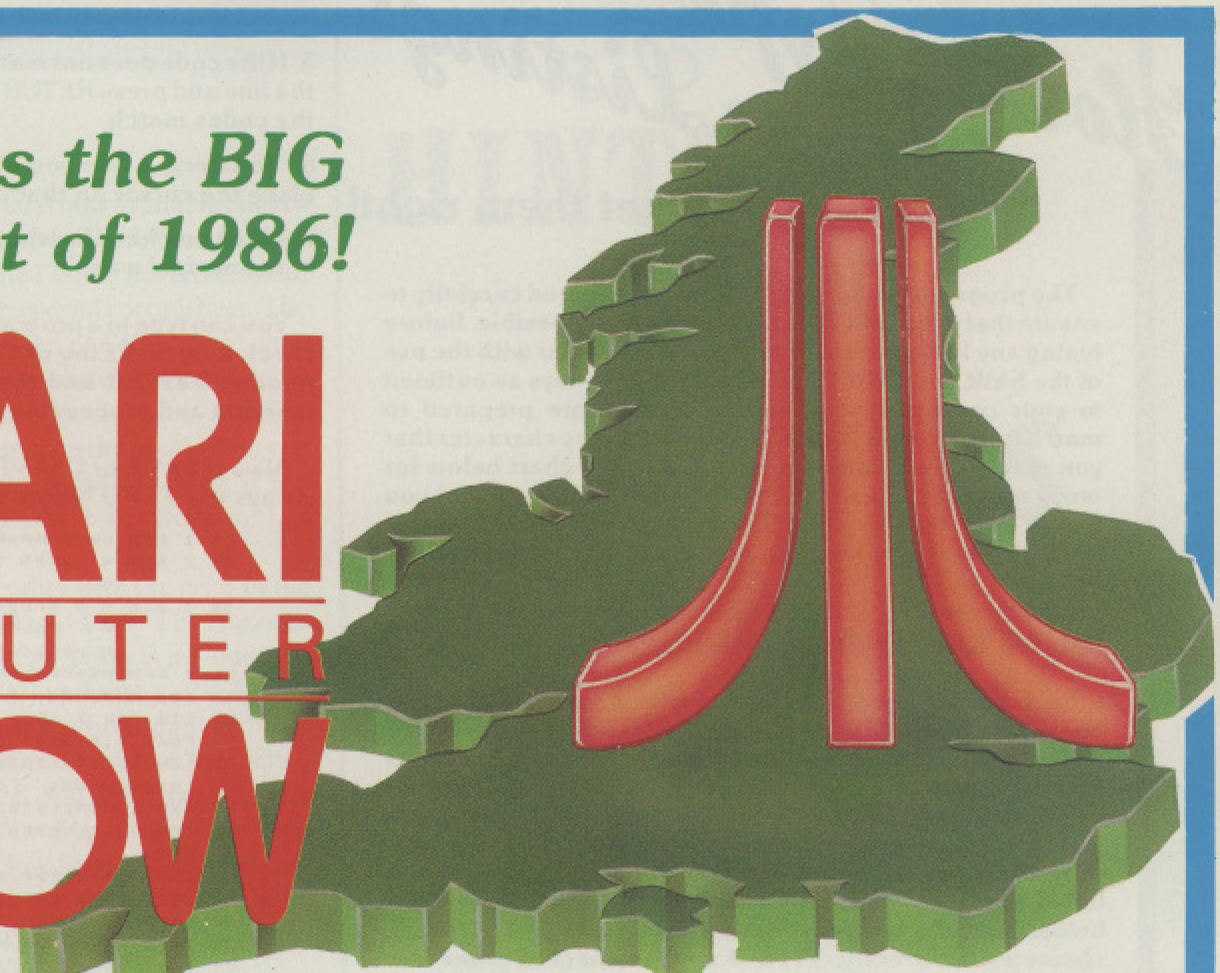
READERS SURVEY & POLL

Boy, did those cards come rolling in! Thousands of them. Thank you to everyone who took the time to fill them in (it wasn't really the lure of the prizes was it?).

It will take some time to analyse the results and this issue has to be completed before the closing date. We will publish a list of the prize winners in the next issue and bring you the results of the survey and poll as soon as possible.

Don't miss the BIG Atari event of 1986!

ATARI COMPUTER SHOW



For the first time Atari UK and all the major suppliers of Atari hardware and software are pulling out all the stops to make the first-ever Atari Computer Show the top event of the year.

Everyone who's anyone in the Atari world will be there. Already many third-party suppliers are planning to use the show as a launching pad for products still on the drawing board.

If you're a long-standing Atari user the show will bring you right up to date on all the exciting developments now taking place in the ever-expanding Atari world.

And if you're one of the many thousands of newcomers to Atari computing it will open your eyes to the vast selection of Atari hardware and software that is now available for the whole Atari range.

It's a show you cannot afford to miss!

Champagne Suite, Novotel, Hammersmith, London W6

Friday	Saturday	Sunday
7 March	8 March	9 March
10am-6pm	10am-6pm	10am-4pm

'The Atari Computer Show will be a shop window for Britain and something that not even our American cousins have achieved'. – ***Mike Reynolds, Sales Director, Software Express.***

'It will provide us with an opportunity to show the Atari consumer just how much good software there is in the marketplace'. – ***Tony Deane, Marketing Director, Silica Shop.***

'There will be an exciting range of new products on display at the show'. – ***Rob Harding, Sales Manager, Atari UK.***

Save £1 a head – and miss the queues! – by sending for your tickets now!

Please supply:

☐ Adult tickets at £2 (save £1) .... £ ______

☐ Under 16s tickets at £1 (save £1) .... £ ______

Total £ ______

☐ Cheque enclosed made payable to Database Publications Ltd.

☐ Please debit my credit card account

Access ____ ____ ____ ____

Visa ____ ____ ____ ____

Admission at door: £3 (adults). £2 (under 16s)

ATARI COMPUTER SHOW

Advance ticket order

Post to: ***Atari Show Tickets, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.***

Name ....

Address ....

....

.... Signed ....

PHONE ORDERS: RING SHOW HOTLINE: 061-480 0171

Please quote credit card number and full address. **P6 3**

How to Type in the Listings

and get them right!

The program listings in PAGE 6 are prepared carefully to ensure that they can be typed in as easily as possible. Before typing any listings ensure that you are familiar with the use of the Shift and CONTROL and INVERSE keys as outlined in your computer manual. The listings are prepared to match exactly what you see on screen. Every character that you may see in a listing is included in the chart below for cross reference. By using TYPO 3 you can ensure that you type in the programs EXACTLY as they are printed. Remember a single typing mistake may mean a program will not run.

WHAT ARE THOSE CODES?

Each line of a program begins with a special two letter code. THESE SHOULD NOT BE TYPED IN. They are used by the program TYPO to check that you have typed each line correctly. IF YOU HAVE NOT ALREADY TYPED IN THE TYPO 3 LISTING PLEASE DO SO NOW. The program can be used as you type in each line of a program or to check an already typed program. The code for each line will match but if you have problems check the listing conventions below carefully, you are most probably typing a CONTROL character incorrectly. TYPO 3 cannot check if a line has been missed so if you have problems in running a listing count the lines in the program and ensure none are missing. If the TYPO codes match and the program still does not run, LIST it to cassette or disk using LIST "C:" or LIST "D:filename", switch off the computer, re-boot and then ENTER the program using ENTER "C:" or ENTER "D:filename". Save this version in the normal way.

HOW TO USE TYPO 3

1. Type in the listing carefully for although you can use TYPO 3 to check itself (see 6 below) it may not work if you have made mistakes.

2. SAVE or CSAVE a copy of the program.

3. Each time you want to type in a program listing RUN TYPO 3 *first*. The program will install a machine code routine in memory and then delete itself. Now type in a line as shown in the magazine *excluding the first two letter code* and press RETURN.

4. A two letter code will appear at the top left of your screen. If this code matches the one in the magazine carry on and type the next line. Note, the code will not match if you use abbreviations. If you prefer to use abbreviations LIST the line you have just typed, move the cursor to that line and press RETURN. The code should now match.

5. If the code does not match, use the editing keys to correct the line and press RETURN again. Repeat if necessary until the codes match.

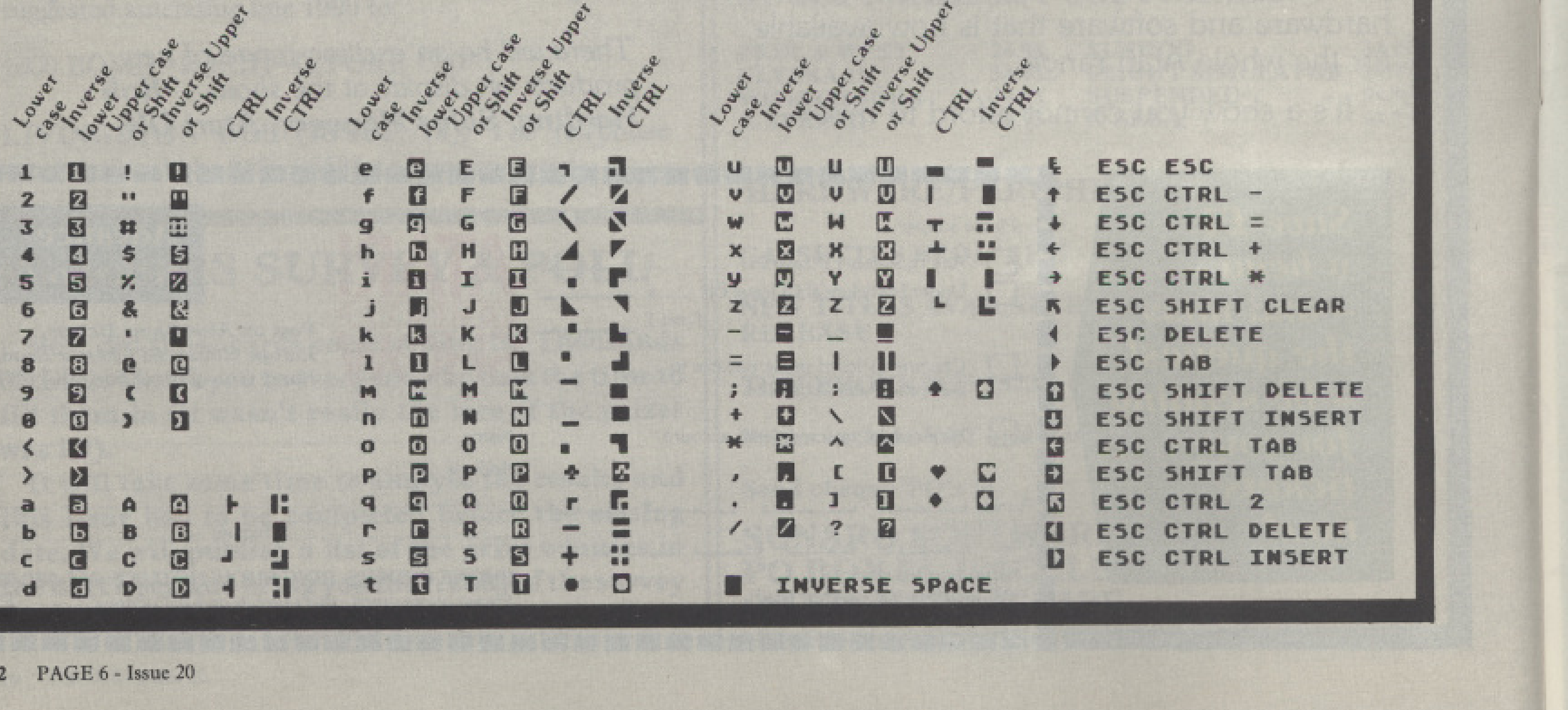
6. To check a line you have already typed LIST the line, place the cursor on that line and press RETURN.

7. When you have finished a listing just SAVE or CSAVE it in the normal way.

You can type in a program without using TYPO 3 and then check it by SAVEing or CSAVEing a copy of the program, running TYPO 3 and then LOADing or CLOADing your program and proceeding as in step 6 above.

Always SAVE or CSAVE a program before running it and always use TYPO before telling us that a program will not run.

```
EI 1 REM ********************************
AL 2 REM *  TYPO III by Alec Benson     *
         *          June 1985           *
SA 3 REM * A proofreader for ANTIC and  *
         *   PAGE 6 based on TYPO II    *
         * published by ANTIC magazine  *
EL 4 REM ********************************
SG 100 GRAPHICS 0
WG 110 FOR I=1536 TO 1791:READ A:CK=CK+A:
   POKE I,A:NEXT I
CG 120 IF CK<>30765 THEN ? "Error in DATA
    statements - Check Typing":END
YM 130 A=USR(1536)
VT 140 ? :? "TYPO III is up and running":
   NEW
MA 1000 DATA 104,160,0,185,26,3,201,69
HG 1010 DATA 240,8,200,200,200,192,36,208
QB 1020 DATA 242,96,200,169,79,153,26,3
RK 1030 DATA 200,169,6,153,26,3,162,0
RR 1040 DATA 189,0,228,157,79,6,232,224
TO 1050 DATA 15,208,245,169,93,141,83,6
KC 1060 DATA 169,6,141,84,6,173,4,228
EU 1070 DATA 105,0,141,95,6,173,5,228
BK 1080 DATA 105,0,141,96,6,169,0,162
KK 1090 DATA 3,149,203,202,16,251,96,0
ZR 1100 DATA 0,0,0,0,0,0,0,0
LD 1110 DATA 0,0,0,0,0,0,32,94
JM 1120 DATA 6,8,72,201,155,240,55,230
TV 1130 DATA 203,133,209,138,72,169,0,133
TW 1140 DATA 208,162,8,10,38,208,6,209
MF 1150 DATA 144,7,24,101,203,144,2,230
RL 1160 DATA 208,202,208,239,133,207,24,1
   65
TM 1170 DATA 204,101,207,133,204,165,205,
   101
AW 1180 DATA 208,133,205,165,206,105,0,13
   3
XM 1190 DATA 206,104,170,104,40,96,138,72
NR 1200 DATA 152,72,162,0,134,207,134,208
GF 1210 DATA 160,24,6,204,38,205,38,206
EA 1220 DATA 38,207,38,208,56,165,207,233
TM 1230 DATA 164,170,165,208,233,2,144,4
SK 1240 DATA 134,207,133,208,136,208,227,
   162
CB 1250 DATA 8,165,207,133,204,165,208,6
XN 1260 DATA 204,42,201,26,144,4,233,26
MB 1270 DATA 230,204,202,208,242,133,205,
   169
BC 1280 DATA 128,145,88,200,192,40,208,24
   9
WV 1290 DATA 165,204,105,160,160,3,145,88
QA 1300 DATA 165,205,24,105,161,200,145,8
   8
MQ 1310 DATA 32,69,6,104,168,76,153,6
```



NEWS

The much heralded VIP Professional is now available but at a cost, both money and otherwise. Price in the UK is £179.95 which might be higher than anticipated but is nevertheless an excellent price for a fully integrated powerful spreadsheet. The other costs? Firstly, the available version of VIP is 'text' only, that is it does not use GEM but more importantly there is only just over 30k available for the actual spreadsheet. A GEM upgrade version is promised (via a coupon in the pack) when you have either fitted TOS in ROM or upgraded to 1 Meg. It is a superb program but does need that ROM to be effective.

The 1 Meg 1040 ST looks to be a reality with the price in the US variously quoted as between $799 and $999. The rumours are that the 520ST in its present configuration is no longer in production (Atari having sold 100,000) and that a new 520ST with TV modulator will be available at a substantially reduced price. Various press reports in the U.K. still say that the 260ST will be launched shortly and Atari UK will not make any firm comment about other models. Rob Harding of Atari has been quoted as saying "We will launch a low level ST product this year" which most reporters have taken to mean the 260ST but if the 1040ST is introduced at the same price as the existing 520ST then surely the 520ST becomes the 'low level ST product'?

Got a modem? Then call up what is said to be Europe's first commercially operating BBS supporting the ST. The STPIP board operates 24 hours a day from Sheffield on 0742 667983 using 300 baud. Sysop is Quentin Reidford who has many years BBS experience and the subscription charge is £5.75 payable by Access online or by cheque. Although it is early days, the board does look to have potential with public domain software for download, a 'Talk to Atari' feature and the usual messages. Being a commercial board it also has software and hardware for sale using credit card facilities online.

Atari has finally sorted out the long wrangle about the bundled software that should have come with the early ST's. Digital Research failed to deliver its promised products so Atari have shipped 1st WORD by GST as the word processor and DB MASTER ONE, a database, in place of GEM PAINT. Also free are MEGAROIDS, a superb true arcade quality Asteroids game and DOODLE. If you haven't had these, get in touch with your dealer *now*.

The CES show in LAS VEGAS in early January saw many more software titles 'soon to be available' for the ST. Among those to look out for are STAR RAIDERS from Atari, probably *the* classic computer game of all time, in a much improved and highly detailed version. The demo version is quite stunning and those who have played with early versions have been mightily impressed.

From Activision is promised ALTERNATE REALITIES, a series of three role-playing adventures originally developed for 8-bit systems but considerably enhanced to take advantage of the ST's greater power. These will be a long time coming though with the first release scheduled for Christmas 1986. Microprose had SILENT SERVICE, again a highly thought of game on the 8-bit which is a simulation based on submarine warfare. Announced, but not shown, was PRINTMASTER from Unison World, a utility similar to Broderbund's PRINT SHOP. From Accolade comes SUNDOG - THE FINAL LEGACY, an Elite style program originally developed for the Apple. O.S.S. have PERSONAL PASCAL the first of several 'Personal' packages from O.S.S. which is said to be up to the usual O.S.S. high standard. ●

HINTS & TIPS

ST ST ST ST ST ST

If you have a window open for a particular drive and wish to see the directory for another disk just change disks and press ESC. Much quicker than closing and opening windows.

If you have problems in figuring out how to change the date and time on the control panel (click with the mouse and use the back space), ESC will clear the highlighted area.

Would you like to auto boot programs on your ST? It really is quite simple. Just create a folder named AUTO and place your program inside it. Make sure that your program has the extender .PRG and away you go!

What is the biggest pain in using a colour monitor and a monochrome monitor? Right, it's pulling that plug out time and again. Well, help may be on hand. The ST apparently has the ability to handle both monitors connected at once with switching controlled by software (or the control panel). It is rumoured that Atari *may* bring out a switch box and also publish a circuit diagram in Atari Explorer. If it appears we will let you know.

It is not very easy to get the ST to work with just any monitor. Firstly the RGB output is analogue and most monitors expect TTL input. This should not present too many problems to TV/Monitor owners as these tend to accept analogue RGB, but the biggest problem to overcome is that the vertical output sync is at 60Hz and most TV/Monitors just can't sync to this, they expect 50Hz. If you've got a TV/Monitor you may be able to purchase a NTSC auto sync sensor conversion board from your TV manufacturer (certainly Luxor and Scantic have one for their sets) and, if you are very lucky, and own a recent model Fidelity, it will work without any mods!

If you want to copy more than one file into a folder or onto another disk you can hold down the SHIFT key and click on each file you wish to copy, even if they are not adjacent. Hold the button on the last file selected and drag them over to the appropriate icon or window and the whole lot will be copied one by one. This also works when deleting files.

If you have trouble getting a printer lead for the ST, you can use an IBM PC/Centronics lead.

The ST's resident screen dump (called by ALT/HELP) is for Epson compatibles only.

You can't rename folders (unless you know different?....) so choose names with care.

Many thanks to David Keel from Hull for supplying many of the hints and tips above. ●

ST Gallery —

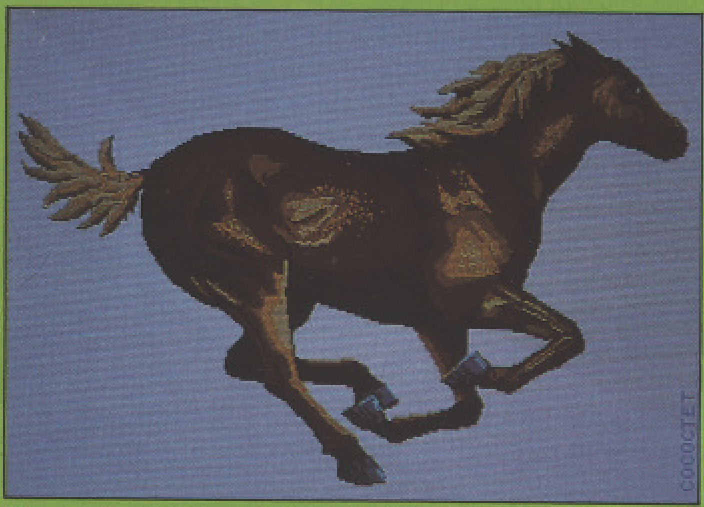






Celsis V by Les Ellingham





ST GALLERY

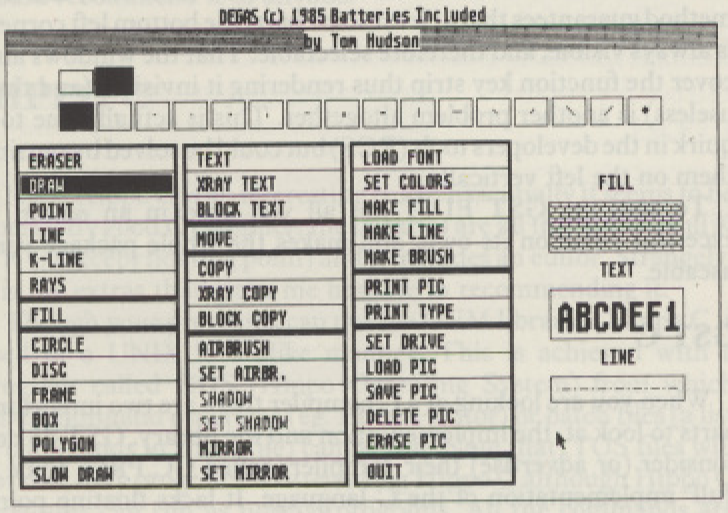
The pictures shown are drawn either with Neochrome or DEGAS and the authors are unknown other than CELSIS V which is by the Editor. Whilst not professing to any artistic merit, it is included to demonstrate the ease of use of DEGAS and the ST. It was drawn in a mere fifteen minutes.

ST GRAPHICS

D.E.G.A.S.
Batteries Included
£39.95

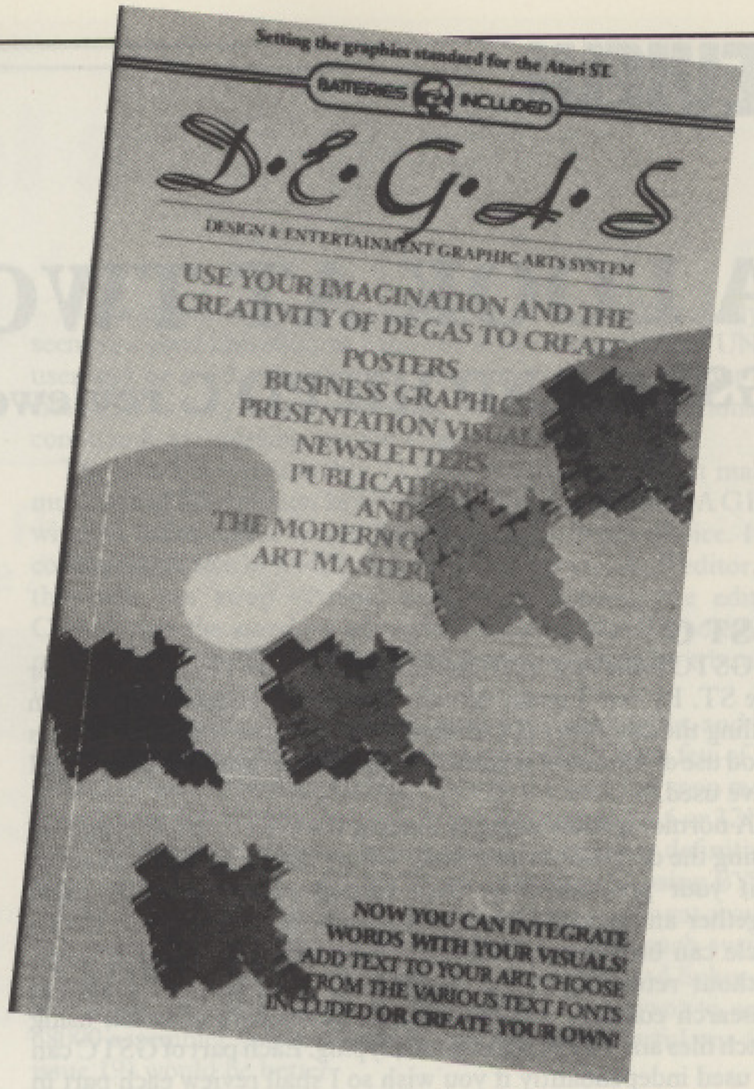
If you were impressed by Neochrome, stand by to be even more impressed by DEGAS, a superb graphic arts system developed by Tom Hudson, formerly of Analog magazine who, I believe, began development of this program as a listing for Analog but has ended up with one of the best packages so far released for the ST.

DEGAS is basically an artists utility to produce superb computer art in low or medium res colour or even in black and white. One area where it far outshines Neochrome is its ability to combine text, in a variety of styles, with any graphic image thereby opening up the whole field of design to those with lesser artistic abilities. Even with the minimum of background design some stunning visuals can be achieved. The secret lies not in the mere placing of text on screen in the conventional manner but in the ability to use text of several different sizes, *and from several different fonts* on the same screen. You can even add shadow in any of eight directions and at any distance to give 3-D or double text. You can use any of the several fonts supplied or design your own with the font editor, another versatile and easy to use program on the disk. Let's not get too carried away by the text, however, for this is also an excellent graphics package.



Graphics wise almost all you would expect from a drawing program is there. A full screen menu gives 39 choices of action with 16 brush sizes and a 16 colour palette in low res together with an illustration of the current fill and line patterns. Selection between this menu and the full screen drawing screen is simply by clicking the mouse. All of the expected drawing commands are there such as Draw, Point, Line, K-Line, Rays, Fill, Circle, Disc, Frame and Box but by using the keyboard other niceties are available such as boxes with rounded corners or perfect circles or Polygons. An airbrush mode is included, in which you can alter settings, and it works in a very similar vein to a true airbrush. You really do seem to 'spray' pixels onto the screen and can fill an area to any density you wish. The Fill feature is extensive with 38 different Fill patterns supplied but also included is an editor to allow you to design your own patterns and save them on disk. Likewise with brushes and lines. If you don't like any of the many supplied, just design your own and save them on disk.

Magnify works superbly. By using the magnify key, a small rectangle appears on screen. Move this over your desired area and click the mouse button and that area will enlarge to fill the whole screen. Each pixel is clearly seen



and can be adjusted as you desire while a small frame the size of the original rectangle appears at the top left of the screen and is updated to show the actual effect of your amendments.

A Shadow mode is available, again set to your preferences, which will work in draw mode but is much more effective with text. Coming back to text for a moment, you have a choice of either Block Text which obscures the background or X-Ray Text which overlays a background design. Block and X-Ray also apply to the Copy mode where you can select any area of the picture to duplicate to another part of the screen.

There is a lot more to DEGAS due to the ability to customise many parts to you requirements. You may change colours, fill patterns, brushes, line shapes, fonts, mirrors, shadows and the airbrush and you can save many of these on disk. Of course you can also save your pictures and show them again with a Slide Show program provided. The pictures are saved in a format unique to DEGAS but a utility is included to convert Neochrome pictures to DEGAS format. Pictures can be printed via an Epson printer driver provided and Batteries Included promise extra printer drivers shortly. Also to come are extra utilities and many more finished pictures some of which will be available commercially and others which will be released into the public domain.

DEGAS has certainly set a standard for drawing programs on the ST although it does have a few weaknesses. It lacks Neochrome's superb ability to cut an image from one picture to another and the adjustment of the colour palette is much more 'hit and miss' than Neochrome's on-screen presentation. The only other niggle is the selection of fill and line patterns where you must cycle through all 38 patterns. If you go too fast and miss the one you are after you must go through again.

One parting comment about the manual. Superb. It is in fact a fifty page paperback book which reflects the thought and design that has gone into DEGAS. Easy to use, visually excellent, you may stop reading now, go out and buy it!

ST ST ST ST ST ST

A LOOK AT TWO C's

GST C AND HIPPO C reviewed by Matthew Jones

GST C

GSTC is the best 'real' application software I have yet seen for the ST. By real I mean actually useful to somebody other than selling the computer (i.e. demos). Best because it actually makes good use of the GEM facilities, unlike all the other ST compilers I have used.

A normal session starts by loading the GSTC 'shell' program. Using the drop-down menus the editor can be called to create or edit your program files, then compile, assemble, link them together and actually run the program. A complete edit to run cycle can be done entirely with the mouse and, what is more, without returning to the desktop. In comparison the Digital Research compiler sold to software developers is awful, using batch files and a lot of superfluous typing. Each part of GSTC can be used independantly if you wish so I shall review each part in order of use.

GST EDIT

A lot of editing goes into any program, and the GST EDIT is wonderful to use. Most other editors available (Metacomco, MicroEmacs, Mince) use the 'TOS' mode of the ST, i.e. using the ST as a 80 by 25 terminal and not as a GEM computer. Such editors are easier to write than GEM editors, and that is why they were out first. GST show what can be done with GEM windowing, allowing up to four files to be edited at once. With each in its own window, life becomes so much easier. Development of a routine is simplicity itself as it is now possible to load the file that calls it, the file that the routine is in, a header file for external definition editing and a GEM interface header for reference (or whatever combination you require).

An editor is not much good unless you can edit, and GST EDIT provides all the usual facilities in an easy to use way. Single key edits like insert/delete word/line, page up or down etc. are available from Function keys, and repeated on a desktop icon 'function strip'. This allows you to select the functions by clicking with the mouse. Cursor movement is just a matter of pointing to the character and clicking, the cursor moves straight there. The cursor keys are available as well of course. Text is entered wherever you place the cursor, and can be in insert or overwrite mode. Lines can be 160 characters long, and scroll bars are used to see text currently off screen.

GST EDIT comes into its own when you start working with blocks of text. Unlike the Metacomco editor blocks, which only start and end at whole lines, EDIT allows you to place the cursor on any character to mark the start and end of the block, and when they are marked, the text is shown 'shaded'. Having marked your block you can cut, paste or delete it. Cutting takes a copy but does not delete the original and paste inserts the cut block (usually used after moving the cursor). A facility I miss is block move which saves cut, delete then paste time and which surely can't be too difficult?

What really makes GST EDIT powerful is that you can cut a block from one file, click on the window of another file to edit it (to 'top' it), and then paste it there. For similar texts this is a godsend.

The last major function of the editor is Search and Replace. This is very nicely done in EDIT, allowing you to choose one, some or all occurances of the chosen text to be changed. When an occurance is found in 'some' mode, a little dialogue box is opened for you to say Yes, No or Cancel to the change. Straight searches are there too. Once a search or replace is specified it can be repeated without entering it again, however this is one of the annoying points as the menu item to select it is not at the top. If it had been it would have been so much faster.

Another time waster is the way the editor opens the windows on the screen. Each successive window is created smaller and inside the previous one. The effect of this is that when you want to edit the larger (bottom) window, all the other small windows disappear underneath. To edit them, you must first re-size or move the larger (now top) window. This is a good lesson for other writers, in that it shows how not to do it. What it should do is open the first in the top left corner, the second a bit down and across, the third down and across and so on. All should be the same size, and this method guarantees that at least some part (the bottom left corner) is always visible, and therefore selectable. That the windows also cover the function key strip thus rendering it invisible (and thus useless) is another problem altogether. This is actually due to a quirk in the developers tools (RCS) but could be solved by putting them on the left vertically.

To sum up, GST EDIT has all you need in an editor, is excellent value on its own, and makes the whole package very useable.

GST C

When you are looking at a C compiler there are two important parts to look at, the implementation and the library. GST do not consider (or advertise) their compiler, called CC.PRG, to be a 'full' implementation of the C language. It lacks floating point arithmetic, multi dimensional arrays (although they can be simulated), macro definitions with parameters (#define A(x)), structures and #include "file" nesting. It may seem a big list but there is a lot to the 'C' language, and there is plenty left to play with. Apart from the omissions, CC.PRG compiles to the Kernighan and Ritchie standard. There are many books on the C language, but the book by Kernighan & Ritchie (who wrote the original C) is the 'bible' to which compilers are written (hence you often see the expression 'a full K & R C').

The C language has no facilities whatsoever for input or output. This may seem stupid, but an integral part of any C compiler is the STDIO library by which the I/O is done. A library contains a large number of object code subroutines which can be 'pulled out' and used in the final program if they are needed (referenced or called). A C program is portable because there is always a standard set of subroutines to call like putchar(), getchar() and printf() (C is written in lowercase). The authors of the different compilers implement these in the best way possible, but they provide a machine independant interface for the programmer. With GEM more libraries are needed, one for the Virtual Device Interface (VDI) and one for the Application Environment Services (AES). Digital Research specified a standard set of calls, and the libraries allow the user to use them in his program. The AES is the part of GEM that looks after all the menus, windows and dialog boxes, and the VDI is the part that does all the writing and graphics in the windows.

GST ASSEMBLER AND LINKER

While there is a 68000 assembler as part of the package, it is only used in this context to help compile C code. The information you get is little more than how to run it, so while it may be the same assembler as they sell seperately (I don't know), you will have to pay again for details. A pity. The linker again is a vital part, but only sparse details are provided as you don't need them. GST are trying to get their linker established as a standard with Metacomco being the first company I know to produce software that can use it. I don't know the merits of GSTs linker, but I hope that a standard is found soon as it would make life so much easier. IBM distribute a linker with every machine, thus ensuring a standard, but not stopping others writing different versions.

CONCLUSION

As with all programs there are a few things that could be improved, the editor window overlap for example, but none are a major problem. It has its limitations, in that a few of the more advanced C features are missing, but GST realise this and are working on some of them. Structures, a facility used a great deal in GEM is one such facility, but can be simulated at the moment. The editor is superb, and is the basis of a word processor to be launched soon. I am very impressed with GSTC overall, and would recommend it to anyone.

HIPPO C

Haba Hippo C is an interesting beast. Essentially it seems to be a perfectly good C compiler, the libraries are all there, it is a full K & R C (except floating point) and it includes an editor. Strangely, it is the extras that make me hesitate in recommending it.

Though your programs can use the GEM libraries, Hippo C is used in a UNIX look-alike manner. This is achieved with a program called HOS (Hippo Operating System) from which other command programs (eg. ED the editor) or batch files (a list of commands in a text file) can be run. Note that .TOS files will not run, only programs written using Hippo C although Hippo C programs can run as normal programs. All the commands are UNIX based, such as LS for directory and CAT for displaying file contents, and HOS behaves in a UNIX type way with standard I/O redirection (though not piping) and if a command file is not found, it is looked for in the BIN subdirectory.

Whilst the standard GEM interfaces are not too bad to write for (compared with doing it all yourself anyway), it is in the GEM area where GST play their joker and make it easy to cheat. By using (yet) another library, you can do all of your I/O to a fully implemented window without doing any more programming than you might for a simple teletype screen. It's still teletype output, but you can have more than one such window, and then start into graphics in the same way. Unique to GST and a master-stroke no less. Well, perhaps a bit less as you have to use non-standard calls which means a re-write if you buy a new compiler. It would have been nicer if you just had to select a different library.

No matter how good a compiler is, you won't be able to make much use of it unless the manual is good too. The GSTC manual covers everything I would expect it to. It doesn't attempt to teach you C or GEM, but gives all the details you need for reference. Use of the shell and editor, the compiler specifications, all the libraries, details of the memory and stack use, and a brief description of the assembler are all included. A green A5 ring binder with matching box (normally associated with higher priced products) rounds off a well thought out and useful manual.

To me, as someone who has never really used UNIX properly, it seemed a good imitation so I showed it to an experienced UNIX user and he tried a few 'simple' commands. It seemed that the similarity is very much skin deep, and many of the options to commands are missing, so don't expect too much.

The editor is a reasonable TOS screen mode editor. It makes much use of the function keys but is nothing exceptional. A GEM window based editor would have been a far better choice. It is common practice in UNIX systems to have a standard editor, so that you can swap systems without re-learning the editor. Considering the standard editor is line based, the Hippo editor may be considered to be better, but not for someone who is buying it for its UNIX simulation.

The C compiler is normally invoked with a batch file, and is a two pass plus compile version. It seems complete, but a few of the GEM portability files are lacking, though the user can soon make these himself. A C compiler may define integers as 8, 16 or 32 bits long, whatever the authors decide, and the portability definitions allow source code to be written for all compilers by using BYTE WORD LONG instead of char, int, and long int et al to get around this problem. The definitions are held in a file on each system (PORTAB.H) ready for inclusion. The assembler and linker are very basic, designed simply for compiling. If you want to write 68000 assembler you could use it, but a more powerful one (see issue 19) would be better.

The Hippo C manual is very smart and comes in a nice ST grey box. Unfortunately, however, just about everything is skimped, from loading the program through to the library listings (which are simply the names of the supported routines). All you probably need for reference is there, but it could have been so much better and it spoils the appeal of, what appears from the list of error code interpretations, a very capable compiler.

One thing that really put me off was the copy protection. I am not against copy protection if it is felt necessary, but it should not work against the legitimate user. HOS was obviously written and tested with the first 'pack-out' version of TOS. This version would boot from either drive A: or B: but always load DESKTOP. INF (the file with system defaults) from drive A:. The instruction was to put the Hippo disk in A:, your TOS disk in B:, and boot. When the old TOS is used, everything is fine and HOS loads with no problem. With the latest TOS, and the fixing of the 'feature' so it loads DESKTOP.INF from the boot disk (A: or B:), your own desktop is always used, not Habas. Try to load HOS now and you are told by GEM that the disk is faulty and then that you must have the original Hippo disk in drive A:, even though that is just what you have! A pain in the neck and not how it should be. As an alternative you can copy Hippo's DESKTOP.INF to your boot disk but I don't recommend this. Each new version of TOS may save different parameters in the desktop file, and if you copy a file from another version, it may not operate correctly (as I have discovered). While a solution to this was found (with help from an addendum slip in the box) it was a big waste of time for me, and wasn't impressive. The master disk can be removed once HOS is loaded to save wear and tear, and all the files can be copied for backup and regular use.

CONCLUSION: What is generally a good programming environment is spoilt by a poor manual and poor copy protection. These though may be improved in time, especially the latter as 3.5" disks develop. Comparing it with GSTC and DRI C as simply a C environment, I would rank it last. GSTC is far easier in use, and DRI C (the developers kit) has extensive GEM documentation. However if you are interested in UNIX, then Hippo C is certainly worth considering, especially as everything fits on one disk. It is certainly quite useable. ●

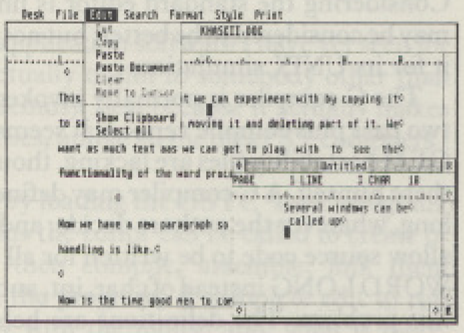
(Editor's note: Since the review was written, a revised version has been announced which, hopefully, will take care of the 'copy protection' problem.)

ST ST ST ST ST ST

SOFTWARE ... all the LATEST...

Software for the ST is now beginning to arrive in force. In this review feature we take a look at several different packages now available.

HABAWRITER
Haba Systems
£74.95



There are many different types of word processor but most people tend to be impressed by those that have a hundred and one facilities and will do anything a professional writer might dream of. These are fine if you need all the facilities but the majority of users don't and the drawback is that the more you have, the more complex the program becomes to use and learn. It can take several weeks to wade through a manual and get used to commands.

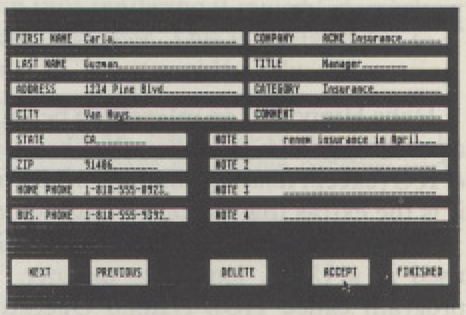
HabaWriter lacks many commands found on more advanced word processors but what it lacks in facilities it more than makes up for in ease of use. It really is one of the easiest to use word processors I have yet seen for the ST. The secret lies in the GEM environment which makes use of almost every function very easy. All documents are created in windows which can be adjusted to suit and you may have up to six windows open at once all processing separate documents. This is ideal if you are rewriting a document or using another as the basis for an article or letter but it is also a godsend if the phone rings and you want to make a few notes or if you get temporarily sidetracked on another project. Each document shows margins and tabs and you may choose whether to show carriage returns and format markings. The display is less than 80 columns but will scroll across allowing you to work on documents up to 132 columns wide. Movement around the document is very flexible by using either the mouse or by using keys either singly or in combination. Cut and paste is the simplest I have yet seen and is one of the programs strengths. To mark a block you simply use the mouse to drag an inverted box over the text until you have highlighted the area you desire. Then simply move the cursor to the appropriate position, pull down a menu and choose from cut, move, paste or copy. Search and replace are equally as easy with a dialog box in which you type search and replacement criteria. You may search forwards or backwards and replace globally if you wish.

Most of the other normal functions you would expect are available but the program does not support double column printing, headers and footers, page numbering or section headings and has limited printer control. There is a printer configuration file for Epson which will give you underline and bold but not much more. Use on other printers might be a problem unless Haba plan to release other printer drivers.

So what are the overall impressions? It depends on what your needs are. The majority of people will find HabaWriter an extremely easy to use program which will probably do most of the things they want. Think carefully about your requirements and if you are not likely to use many of the more sophisticated features of word processors such as page numbering, double column printing and the like and would prefer spend your time using rather than learning to use the program then HabaWriter can be considered excellent. If you need all the whistles and bells this one is not for you.

Footnote: Just as we went to press we received an updated version of HabaWriter, version 1.1, which allows the creation of additional printer drivers as well as the facility to program the keyboard to several different configurations. The main program remains much as before although several small refinements have been introduced.

HABADEX PHONE BOOK
Haba Systems
£59.95



The first in a series from Haba entitled 'Solutions', this program is further titled 'Personal Information Manager and Phone Dialer'. It is basically a small database with fixed fields for keeping name and address type information although it can be used for other purposes.

Haba seem to have a policy of producing software that is easy to use and the major strength of the Phone Book is its simplicity for the user. All control, apart from the actual typing in of the information is by the mouse and it really is a joy to use. Each record in the file has 16 fields which are set up for name and address, home and business phone, company, title, category, comment and notes. To enter information you merely click at the appropriate field and type away. Once your records are completed you may organise them by any particular field and can call up a summary in alphabetical order with a feature that looks just like those tab index flip-up telephone books. Again very easy. The summary appears with just four fields from each record but if you want to see the full information on any record just click the mouse and the full record will appear.

If you need a hard copy of your records, or of particular records, they can be printed out using various criteria for searching. In addition, there is a facility to print mailing labels which is again all mouse controlled and could not be simpler. The final facility is the ability to dial any of the

continued on page 20

phone numbers via a Hayes compatible autodial modem, just by clicking the mouse on the appropriate number. I have my doubts about the usefulness of this part of the program to the majority of users in this country but it is there if you want it.

If you are looking for a small database to keep your personal records without having to work out how to set it all up then Habadex PhoneBook is ideal. It does have search and sort facilities and can be changed to suit many other record keeping tasks, provided they fit within the fixed format, but it will not do anything more complex. Top marks for ease of use. Weaknesses lie in the lack of flexibility but then many people don't need a super sophisticated database. My only other reservation is the price. At £59.95 you may need an awful lot of friends to justify throwing away your old address book!

HOLMES & DUCKWORTH TOOL BOX Vol.1

Mirage Concepts
£29.95

Another from 'Holmes & Duckworth micronomists' which will be of interest to developers, hackers or just the ordinary user who wants more flexibility in using disks with the ST.

The Tool Box consists of five very useful programs. First off, there is a File/Sector editor which enables you to change information on any file on a disk or any sector. Most owners will have had some experience of using a disk editor and will know the many things that can be done from simply playing with program titles to recovering garbled files. The editor works with a combination of GEM and the keyboard and is very easy to use. Following on from this there is a Memory Editor which allows access to any area of RAM for changes in information. Again this is easy to use but is only of interest to the more experienced programmer.

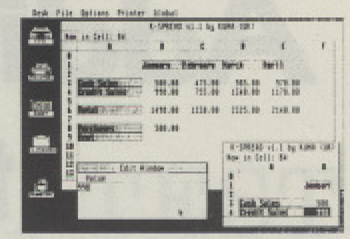
The remaining programs are useful to anybody and will be a blessing as your collection of programs builds up. Fast Format and Copy does just that, it copies an unprotected disk in just one minute forty seconds with two drives without having to format the destination disk first. It is very convenient to use and you will certainly not go back to using GEM to first format and then copy a disk. Deleted File Recovery is one that you may never use but when you do need it you will be glad to have it. Basically it is intended to recover any file which you have unintentionally 'trashed'. One of the problems with GEM is that there is no way out of that rubbish bin! Sometimes it is not possible to recover the whole of a file but this utility will enable you to recover at least 1K and in many cases the whole file. Even 1k is better than nothing especially with data files.

To round off, there is Directory Print. One of the biggest frustrations of GEM on the ST is that someone forget to include a facility to print directories. Now you can create a 'directory file' on your disk which can be printed out from the program or loaded into a word processor for editing. You can even use this to create a master directory of all of your disks and so have a limited catalogue facility. I can see that I will use this time and again.

All in all, a very useful collection of utilities which will benefit most owners, especially those who write their own programs.

K-SPREAD

Kuma
£49.95



If you look at the 250 plus page manual for VIP Professional and then compare it to the 17 page instruction booklet for K-SPREAD you might be forgiven for dismissing K-SPREAD out of hand. But hold on a minute, don't be so hasty, you might be missing an excellent program and it could be the one for you.

K-SPREAD is a straightforward spreadsheet, nothing more, nothing less. It does not support extensive keyboard macros, graphing, database utilities or the like but how many ordinary people or even small businesses *really* need all the power of the fully integrated professional packages? The real bonus of K-SPREAD is that it is so easy to use. There are no messy key stroke sequences to remember and very little need to refer back to the manual once you have learned the basics. Apart from data entry, almost all aspects of the program are controlled by the mouse, and it is so easy you won't believe it. Want to change column widths? Just grab the column and extend it to the desired width, no need to work it out. Change just the one column or all. Want to duplicate some headings? Grab them and move them to another column. Likewise with figures and formulas. When you move columns or rows that have formulas, you are asked if you require formula amendment and this way it is easy to set up a number of formulas without extra keyboard entry. One word of warning though, check the formula you have just created for it may not be exactly as you thought. Not really a bug, more of a case of insufficient planning on your part.

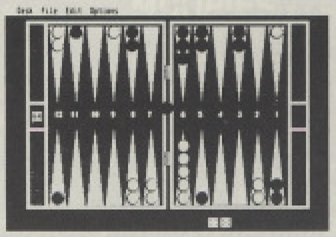
I do not have room to explain the various uses of the spreadsheet but most financial requirements of the home user and small businessman can be accommodated by K-SPREAD. The worksheet has a capacity of 8192 rows by 256 columns, limited only by the memory of your machine. At present, with TOS on disk, K-SPREAD gives you just over 100K compared with just 30K on VIP at present. There is adequate cursor control between cells and the basic formulae needed for row or column calculation. Copying via GEM is excellent and files can be saved or merged with other data as well as printed out. One very good feature is the ability to open up a total of five windows at any one time so that you can see what is going on in different parts of the spreadsheet. The worksheet can be viewed in two different sizes although the smaller of the print sizes does strain your eyes a bit.

Printing is one of the areas to which Kuma has paid a bit more attention than most, for K-SPREAD allows you to send control codes to your printer from within the program or set up your own printer configuration file. The Epson configuration is supplied, naturally, but it is good to find a software manufacturer who recognises that there are other printers, or who is not too lazy to bother with such 'unnecessary' frills.

I must admit that, having seen the power of VIP, I was ready to dismiss K-SPREAD but I am very impressed, particularly with its ease of use. Highly recommended as a 'starter' spreadsheet and if you want to go on to graphing and data handling, Kuma will have complimentary packages in due course. K-SPREAD might do all you want, so why pay a higher price for all the frills of Lotus 1-2-3 when you may never use them?

HIPPO BACKGAMMON

Hippotamus Software
£39.95



Backgammon is one of those simple games that either seems very boring or hooks you completely. If you already know the rules and fancy sharpening up your play then Hippo Backgammon can be highly recommended. If you are a complete novice you will find a full explanation of the rules on the disk but it may first be worth buying a cheap backgammon board game to see if you like it.

Although a fairly simple game I find it fascinating and I have had many hours of enjoyment with this version. The game is essentially a solitaire game where you play against one of two computer 'robots'. The strengths of the program are that you can alter the 'intelligence' of the robots by amending or creating files called 'Neurons' and 'Cortex'. If you want to study the strategic importance of various moves and to see how the robots 'think' you can call up these details. Several parameters in the games can be altered. The program works in mono or colour and the colour version gives a choice of two colour layouts which is good as the default colours are awful! You can change sides in a game, input your own dice rolls to test play, 'undo' moves or just sit back and watch as the two robots play each other. The graphics are excellent and animation of the pieces good. Control of the dice and pieces is entirely with the mouse making play very easy.

Overall the game is excellent but there are one or two design problems. It is difficult to know at first exactly how to get started. You do not throw the dice but simply accept the value of the dice at the start of the game as your first move. Placement of the pieces has to be quite precise and if a piece won't 'go' when it should you begin to wonder why. To make the robot play you click on the dice, (your throw is done automatically at the end of the robot's turn), but this can be confusing as occasionally you tend to click the dice thinking it is your turn only to lose your throw. Another weakness is that the rules of backgammon state that you must move if possible but it is quite easy to cheat (even accidentally) by forcing the robot to play again if it is to your advantage not to move. Provided that you play to the rules, these problems will not cause too much bother but they should have been dealt with at the testing stage.

To sum up, if you like solitaire games or are hooked on backgammon, Hippo Backgammon can be highly recommended. You will certainly learn to play better and with the ability to change the way the robots play you can go a lot deeper, if you wish, than with a straightforward board game.

THE CRIMSON CROWN

Polarware (Penguin Software)
Requires Colour Monitor
£39.95

First take a look at Garry Francis' Adventure column in this issue. He mentions that Transylvania has a sequel called The Crimson Crown due for release and sure enough here it is - but on the ST!

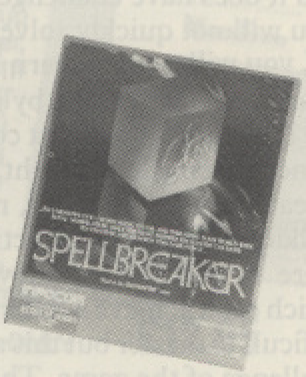
The Crimson Crown is subtitled 'further adventures in Transylvania' and Garry's column will give you sufficient background to know what to expect. Billed on the package as a spine tingling interactive novel which understands full and multiple sentence commands with a vocabulary of over 100 words, it is an interesting adventure but it is not in the class of Infocom. The package is nicely presented with a Journal and map and a few other bits and pieces and the program has some nice touches. It uses the mouse, with keyboard alternative, for movement by clicking on the appropriate compass point, and for loading, saving and quitting games as well as listing the last few moves. The pictures can be switched out to reveal more text and the mouse control makes it very comfortable to play. The keyboard is of course used for all other instructions which are accepted as in a conventional adventure.

I haven't played too far through the adventure so I cannot comment on its complexity or otherwise but it is certainly enjoyable with puzzles that are definitely not as complex as Infocom's Expert level! The most disappointing aspect is the graphics. Don't get me wrong, they are good, but no better than on an 8-bit system and hardly live up to the box description of 'beautifully detailed'. They are essentially line drawings in colour with the appropriate colour fills and the only difference between them and an Atari 8-bit Graphics 8 display is that true colours can be used instead of artifacting.

If you are looking to buy this for some stunning graphics then you will be sorely disappointed. As an adventure it is sufficiently interesting and slightly better than on the 8-bit systems. Certainly the mouse control adds that little bit of finesse. Definitely one for Adventure addicts but Graphics freaks should wait awhile.

SPELLBREAKER

Infocom
£37.95



Now you didn't really expect me to finish an Infocom Expert level adventure in the few days before copy deadline did you? Suffice it to say that Spellbreaker is the third and final part of the ENCHANTER trilogy and has all the detail and intrigue you have come to expect of Infocom.

Magic is the very core of existence for an Enchanter but now magic itself is failing. Why? That is for you to discover and rectify - if you can. You start at a meeting of the Circle of Enchanters where complaints are being aired about failures of all kinds of things. You listen intently to the argument and debate when suddenly, before your eyes, each of the Enchanters turns into a newt, salamander or frog! You turn just in time to see a shadowy figure rush out of the door, you follow and the adventure begins.

Infocom on the ST plays very well with a full 128k of story in memory, fast response and an 80 column display. Of course, being text only the basic presentation is no different but you don't need it to be. In a good book you don't look at the typestyle or the layout, you just read the story, if it is interesting enough, and Infocom know how to come up with an interesting story.

If you have played Infocom before you will almost certainly want this one. If you are just beginning, beware, there is strong magic and mind-boggling puzzlement at Expert level.

→

BRATACCAS
Psygnosis
£34.95



Here at last you have it, the megagame, the 'smash' of PCW, the game that many have said sets a new standard, that is even worth buying an ST for. So is it as good as it has been heralded? Well before I give you my opinion let me say straight out that hype turns me right off. I refuse to go and see all the films that are 'blockbusters' before they are even released or buy something simply because a few journalists and TV people were mightily impressed by all the freebies at a promotional launch. From this point of view I found it hard to be objective about Brataccas. At first sight I was quite disappointed, but I put it away and looked at it again a few weeks later and was quite impressed.

It *is* a good game and somewhat different from any you have seen before. It does have a cartoon feel about it with some excellent animation and fine control of your player and it does have challenges aplenty to keep you occupied. You will not quickly solve the mystery of Brataccas. First off, you will need to learn how to control Kyne the central character. This can be by joystick, keyboard or mouse but the latter gives the finest control. Kyne can have four basic stances, facing left or right, away from or facing the screen. In each of these stances, movement can be normal, as in walking or running or action, as in fighting. Additionally there is emphasised movement and double movement which each achieve a different reaction. Control is fine and difficult to master but this alone adds to the complexity and challenge of the game. The plot is simple. You have been accused of a crime you did not commit and set out to prove your innocence on a strange world called Brataccas. You will meet many adversaries, human and otherwise and will have many puzzles to solve, not least of which is to find who is your enemy and who is your friend. You will need to read the manual thoroughly which is in itself a work of art featuring illustrations by Roger Dean famous for his Yes album covers.

Brataccas begins with an excellent loading sequence with music played throughout the load and continues with good graphics and excellent action but there is somehow something missing about the look of it. Maybe it looks too much like a conversion from the QL. Maybe it is just all the hype putting me off.

So is it as good as they say? Well, it is *very* good, but it is by no means the definitive game on the ST. This is still early days and there will be many games coming along that will make people wonder what all the fuss was about.

Most of the software for this review feature was kindly supplied by Software Express in Birmingham. Telephone 021 328 3585.

HOLMES & DUCKWORTH FORTH
Mirage Concepts
£49.95

This is a new version of Forth-83 presented in a most friendly way by Chester Holmes and Oliver Duckworth. It comes in a simple box the size of a 3½" disk without a manual. The full instructions are on the disk but you will almost certainly need a printer to take it all in.

This Forth was developed by Holmes and Duckworth for use in developing their own commercial software and is released to encourage others to develop software for the ST. A full run time system is included at no cost which means that you can sell any software developed with this package without payment of royalties. All that is requested is a simple credit in the program. Forth can be used to develop code for many applications from Artificial Intelligence to graphics, games and business applications. This version was developed specifically for the ST and allows full access to all of the ST GEM commands and supports the graphics, midi and printer commands of TOS. The authors claim that this version will give developers greater access to the many features of the ST. The source for many of the Forth 'words' is included along with information for those who have Atari's development software but, providing you know the Forth language, the program can be used without access to other software. Many other Forths use a 16-bit stack which gives access to only 64k without special programming but this version has a 32-bit stack allowing access to all of the ST memory and is completely relocatable.

Although the instructions give some general background on Forth, it is stressed that there is no tutorial included and you must already know Forth or be prepared to purchase an appropriate textbook. Details of a few recommended titles are included. I must be honest and say that I am not qualified to test Forth to any depth but with this version being based on the most recent version of Forth and being enhanced specifically for the ST, it looks to be a good bet for anyone interested in a fast easy to use language.

HABAWRITER MAIL MERGE UTILITY
Haba Systems
£39.95

This is the utility that will merge together HabaWriter and the Habadex PhoneBook. If you wish to write to any or all of your contacts held in your Habadex PhoneBook just create a letter with Habawriter, inserting the appropriate fields from the PhoneBook and print away. You may choose to include or exclude certain records by matching up different criteria. Printing of documents is controlled by the utility so all you need to do is save your letter and the Phonebook file on the same disk. If you do not have the PhoneBook, don't worry, for you can still create your names and addresses as a HabaWriter file.

Printer control is quite good as you can change the Epson printer driver supplied to suit your own printer by loading it to Habawriter and changing the codes. Other printing selection such as length of form, form feed or wait are selected with the mouse.

Using mail merge is not as difficult as many people think and if you have not used it before you will be surprised at how good the 'personal' standard letter looks. ●

microdeal

ATARI ST

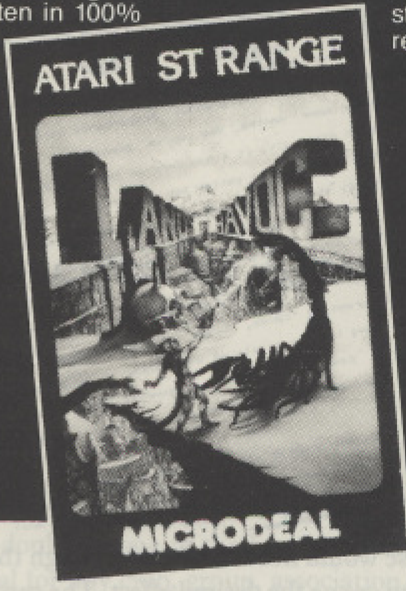
MichTron

LANDS OF HAVOC *From Microdeal*

by Steve Bak. Microdeal's 2000+ screen arcade adventure with its full colour maps, the Book of Change and Sador; our reptilian hero, has just been acclaimed as the first Mega-game available for the machine. Superb full colour graphics, roaring with sound and written in 100% machine code. Excellent value at ONLY

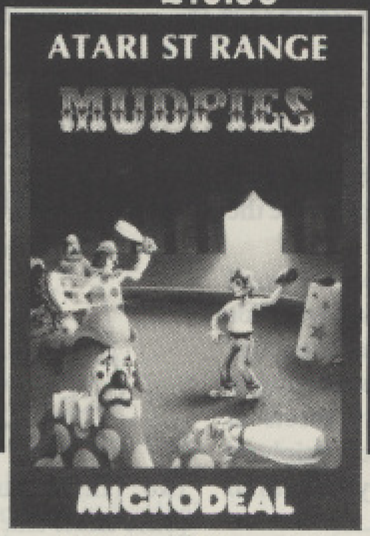
£19.95

Will run on both colour & black/white systems.



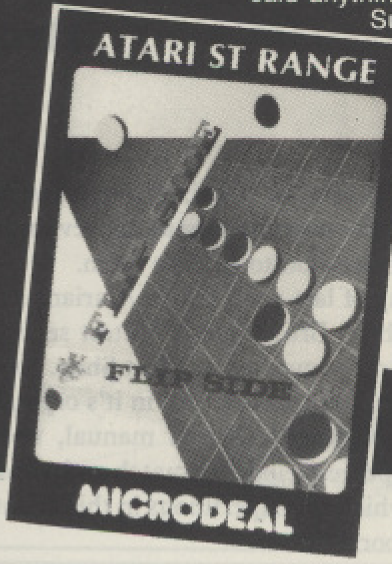
MUDPIES *From Michtron*

. . . Arnold grabs a MUD PIE and throws it at the nearest clown, hitting him smack in the middle of the face!! The clowns, who don't think it's too funny, start THROWING things back and try to catch him!! NOW THE FUN REALLY BEGINS!!! Superbly animated strategy arcade game. Colour Monitor required. ONLY **£19.95**



FLIP SIDE *From Michtron*

This REVERSI type game combines Chess-like depth with Checker-like ease for an excitement all of its own! Surround an opponents piece and FLIP it over. This simple rule leads to strategies as detailed as your imagination. For 0, 1 or 2 players, 6 levels of difficulty, a Speed option and a Help facility (who said anything about cheating???). Superbly presented and ONLY **£19.95** Will run on both colour & black/white systems



See us at the ATARI COMPUTER SHOW
7-9 March Novotel London

M-DISK *From Michtron*

A RAM - DISK emulator uses a portion of your computers memory to load, store and save data. IT ACTS LIKE A NORMAL DISK-DRIVE . . . BUT . . . has no mechanical parts. M-DISK is software based and can utilize up to 800K of memory (if it is available). M-DISK is super fast, incredibly tough, and costs

ONLY **£12.95**

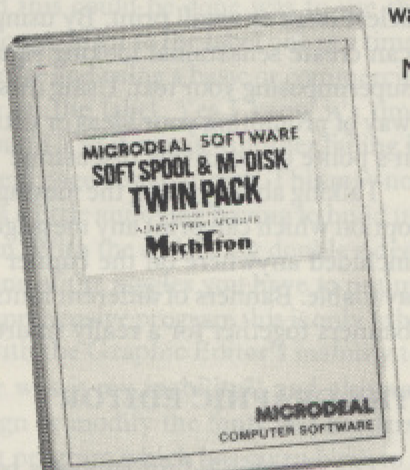


SOFT SPOOL *From Michtron*

While printing files (from a word processor, TOS, etc.) your computer is simply dead weight; tied up waiting for the printer to finish. However, with SOFT SPOOL, the wait is over!!! NOW YOUR COMPUTER CAN PRINT AND THINK AT THE SAME TIME! This software spooler sends printed data to the printer between tasks freeing the Computer for more important things (like playing Mudpies . . . maybe??) and saves you literally hours of computer time! An excellent utility and ONLY . . . **£12.95**



SOFT SPOOL/M-DISK TWIN PACK



Now the previously mentioned utilities available in 1 money saving Twin Pack. Contains both manuals plus 1 disk. ONLY **£19.95**

TIME BANDIT *by Bill Dunlevy & Harry Lafnear from Michtron*

Battle Evil Guardians as you try to escape with the Treasures of Time. Dual-player mode even lets two play simultaneously, each on his own window!

Use the Timegates to visit over 20 unique adventuring areas with over 15 levels each! Explore medieval dungeons, western frontiers, and future worlds all in one game!

Unique creatures and 3-D terrain for each Time, beautiful scrolling landscapes, detailed animation, thrilling sound and music, hundreds of screens: the conquest of Time and Space awaits you!

For the Atari ST with color monitor **£29.95** Due out Feb 1986

M-COPY *by Timothy Purves of Michtron*

Designed for duplicating program discs, *M-Copy* minimizes the time to make copies and ensures that the operator will notice when a copy fails.

After the source disk is copied into memory just once. all the operator has to do is put in blank discs.

M-COPY speeds through disk duplication because it formats and copies only those tracks needed by the program. Instead of wasting time on the rest of the disk, *M-Copy* moves on to the next disk. For the Atari ST a must for companies copying disks in bulk. **£49.95**

UTILITIES *by Timothy Purves from Michtron*

Keep control over your Atari ST files, even when things go wrong. With an ability to address individual bytes, you can change file contents, change file and volume names, change file attributes, format individual disk tracks, copy individual sectors, restore deleted files, recover data from damaged disks and repair damaged disks.

Utilities works with the GEM interface to provide easy, menu-driven operations. Changing file contents, attributes or names is just a matter of typing in the new information or clicking on selector buttons.

Even restoring deleted files only requires that you inspect data, then click on a button to save or reject it. Sector-by-sector copy and track-by-track format routines let you gently handle damaged disks.

For the Atari ST **£39.95**

DISK HELP *by Steve Bak from Microdeal*

If your disk has crashed and you're not an experienced programmer able to repair it with UTILITIES then this easy to use menu-driven program will attempt to repair the disk and bring back lost data. This program will format a disk without erasing. It will re-write the directory, check a disk and list bad sectors, repairs files with bad sectors so they beome readable even on physically damaged discs. If you use data files on your ST you cannot afford to be without DISK HELP. Can be used with 1 or 2 single or double sided drives **£29.95**

Microdeal programs are available from ATARI ST Dealers or by post from

MICROPOST

24 hour order system

Post & Packing 75p per order.

41 Truro Road, St. Austell Cornwall PL25 5JE England
Telephone: 0726 68020 Telex: 45218 MICROD G

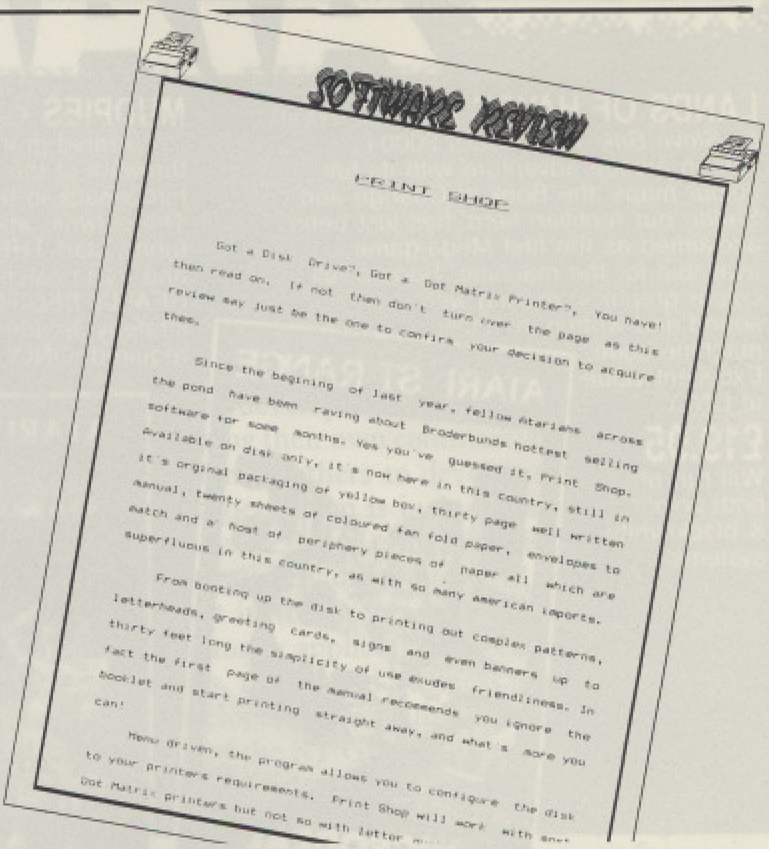
All majr credit cards accepted for telephone orders

Access VISA

Review

PRINTSHOP

Broderbund



Got a Disk Drive? Got a Dot Matrix Printer? You have, then read on. If not then don't turn over the page as this review may just be the one to confirm your decision to acquire them.

Since the begining of last year, fellow Atarians across the pond have been raving about Broderbunds hottest selling software for some months. Yes you've guessed it, Print Shop. Available on disk only, it's now here in this country, still in it's orginal packaging of yellow box, thirty page well written manual, twenty sheets of coloured fan fold paper, envelopes to match and a host of periphery pieces of paper all which are superfluous in this country, as with so many american imports.

EASY TO USE

From booting up the disk to printing out complex patterns, letterheads, greeting cards, signs and even banners up to thirty feet long, the simplicity of use exudes friendliness. In fact the first page of the manual recommends you ignore the booklet and start printing straight away, and what's more you can!

Menu driven, the program allows you to configure the disk to your printers requirements. Print Shop will work with most Dot Matrix printers but not with letter quality types. Once the printer set up has been configured then you no longer need to return to that option unless you use a different printer. Taking you through the menu, options displayed are Greeting Card, Sign, LetterHead, Banner, Screen Magic and Graphic Editor. All except the Screen Magic and Graphic Editor let you use any of the sixty icons and eight different fonts included on the disk. The Screen Magic option can use fonts only and the Graphic Editor, icons only. Both the Greeting Card and Sign options also allow the use of 9 different borders. All text can be in three styles, Solid, Outline and 3-D.

Okay, so now you know what Print Shop has got, lets see what it can do. If you've always admired the graphic quality of professional letterheads but never been able to afford them or didn't want 1000 or more of the same design then Print Shop will allow you to create your own using any of the above icons and fonts. Text can be centred, justified left or right for both top and bottom of the page. Icons can use the same format but with the extra touches of continuous tiled effect or both corners at the same time. There are three lines for both top and bottom to place any message you like but this can only be done in the normal Atari font.

GREETINGS CARDS

Greeting Cards are another option available. Again you design your own (this is generally the format throughout the whole program) or in this part you can command the computer to design one for you. The cards are only small, made up from a sheet of A4 paper folded into four. Select from the borders, icons and fonts to personalise your greetings. When printing the card it appears upside down which had me worried at first but with a quick look at the manual I confirmed that it was working correctly and once folded it soon takes on the normal appearance of a card. I felt that it would be much better if it could print out across the page folding the page in two. This of course would need to be put through the printer twice (once either side) to create the desired effect. The cards, incidentally, look much better on coloured paper than plain white.

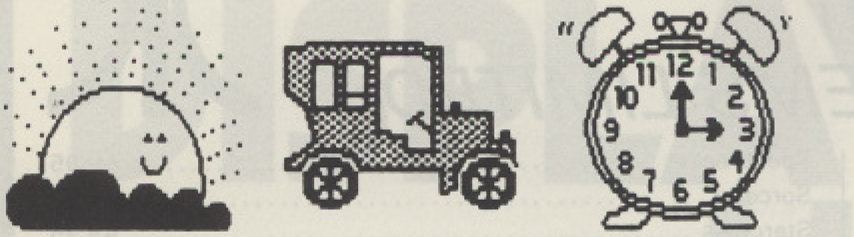
The program really comes into its own with the Sign option. Like the other modules, standard A4 paper is used. If I had to choose a favourite part of the program, this would be it. Select your border and icon in any of three sizes, design your layout of icons depending on what size you chose, then compliment the poster by overlaying your message. Again in any of the eight fonts. You can at this stage select large or small print. By using one of the patterned icons you can create sensational looking signs by tiling the icon layout then superimposing your text. Using these posters is really an eyecatching way of promoting your ideas or getting the message across whether it's polite or positively disgusting!

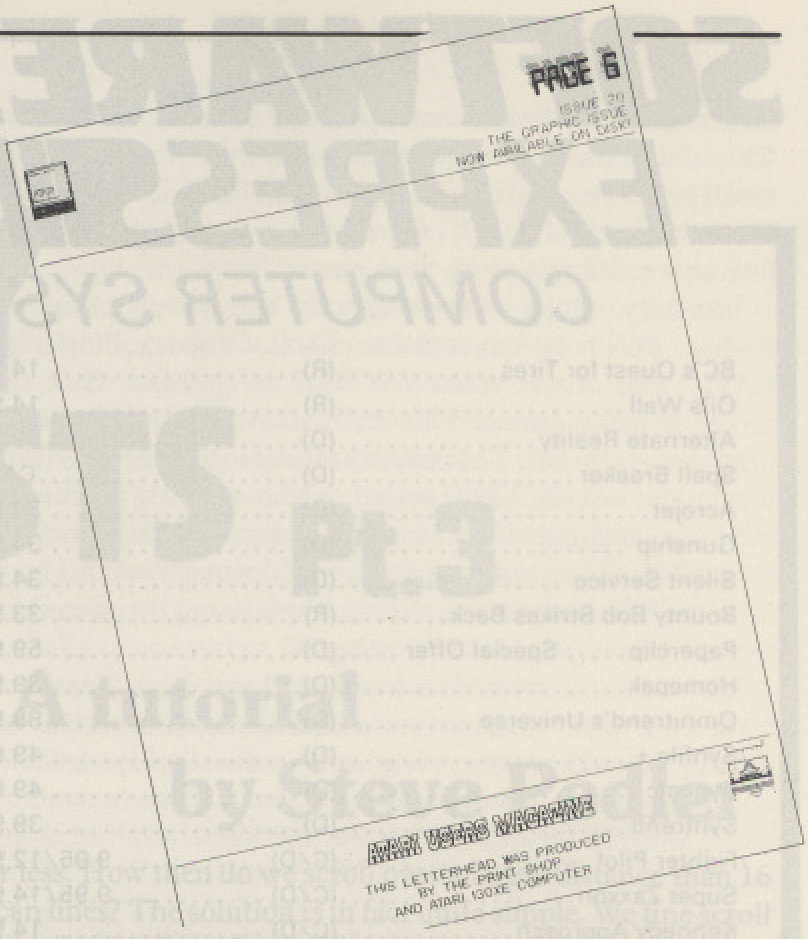
Talking about getting the message across, we come to the Banner option which can print any message up to 30 foot long. Icons can be included anywhere on the banner and all the fonts and styles are available. Banners of different fonts can be created by mixing small banners together for a really smart looking message.

THE GRAPHIC EDITOR

The Graphic Editor supports both joystick and touch tablet as well as cursor control. Creating your own icons with the touch tablet is almost impossible at least it defeated me quite easily. The drawing area consists of an 88 x 50 grid which makes my designs rather simple. The Editor in my opinion is rather cumbersome. I somehow feel that it was thrown in as an afterthought, however having said that it is a welcome addition to the program. Should you feel adventurous enough to design your own icons then modifying the originals is a good grounding into creating your masterpieces. Other commands in this section include format disk, load, save and print. Only icons can be edited and when printed from the editor routine are only small size.

An unusual feature of Print Shop is the Screen Magic module. This in effect is a kaleidoscope or rather twenty-four kaleidoscopes which can be swopped, frozen, saved to disk, reloaded and printed out. In a way it is really a separate part with only the fonts available from the main part of the program. Text can be superimposed on any kaleidoscope in any of the available fonts. In the print out, the size of the dump only fills half a page and you select either the top or bottom half of the paper. Normal or inverse dump is also included in the option. A mini-DOS is available which lets you format the disk to save your screen magic pics. So far this seems to be the least used part of the program but perhaps the one with the most potential.





reviewed by Alan Goldsbro

CONCLUSIONS

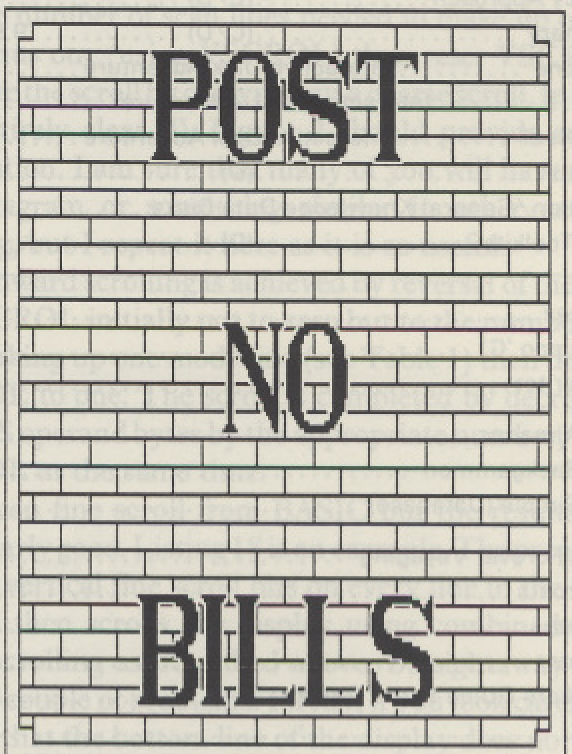
To sum up Print Shop in a few words is an impossible task. Without any doubt its one of the best programs available for the Atari. It's ideal for any club, group, association or even individual who wishes to get the best out of their printer and presentation. It might be easier to just state its good points and its failings. It's quite easy to get blase about any program once you begin to master it but Print Shop, as good as it is, still leaves you wishing it could do more. The good points include the ease of use throughout the whole program, all the modules are superb but each could do with a little extra. One main failing is its inability to print labels as a module on its own. The only way I found this could be done was to use the Graphic Editor and dump the icons down to the label one at a time, then reload the labels in the printer and using a basic or commercial program just type the caption on the label. Yes I know it's time consuming but the only way round it so it seems. Another failing is not being able to save your current page design to disk. This may not seem much of a problem but it's a little annoying having to build up your design every now and then. With the disk being double sided, swopping it back and forth is one of the niggles you have to put up with, mind you with such a comprehensive program this is only to be expected. I was disappointed with the Graphic Editor's inability to produce high quality icons (or was it my inability?) and also not having the opportunity to design or modify the fonts and borders.

In general this is an excellent program which has given birth to a number of clones (some of which I'll review at a later stage) and I'm sure Print Shop will have tremendous appeal to all printer owners. My children plague me to print out more and more icons just so they can colour them in. I hardly get chance to use it myself!

On the accessory front there are three data disks each containing 120 new icons which can be purchased separately at £22.95 each. Fan fold paper refills are also available although I am not sure who would want to pay £19.95 for it when you can purchase a ream of coloured paper for less than £7 from any good stationers. Antic Magazine have also produced a conversion program to download MicroPainter and Micro Illustrator files to Print Shop format. This should go some way to appeasing my frustration of the Graphic Editor.

Finally a word of warning, Print Shop is set up for the XL/XE models and although it works normally most times on the pre 83 400/800's it can throw a wobbly and spoil your design on these older models. Don't let this put you off though, it's still a great program.

The price is £39-95 which may seem steep but at least you'll never get tired of it. My thanks go to York Computer Centre for supplying the disk. I have not regretted buying it and I am sure you won't.



DISPLAY LISTS Pt. 3

A tutorial

by Steve Pedler

SCROLLING

One of the most spectacular effects possible on any micro is fine scrolling. I recently read a review for a BBC micro program in which the fine scrolling was praised. The reviewer went on to say that this effect had needed the shifting of more than 20,000 bytes! The same scrolling could be achieved on an Atari by manipulating just a couple of dozen bytes as the Atari has inbuilt hardware scrolling - a feature otherwise found on much more expensive machines. As you will know, scrolling can take place in two directions, horizontal and vertical (the frequently seen diagonal scrolling is a combination of the two). Let us consider vertical scrolling first, as it is slightly easier to implement than the horizontal effect.

Coarse scrolling (the type you see when LISTing a BASIC program) is easily achieved by manipulation of the DL, as demonstrated in Listing 17. If you have followed and understood this article so far, you should find it easy to see how this program works. It first points the display memory to the lowest RAM of the Atari then coarse scrolls over the entire memory space of the computer. You will remember that the LMS instruction at the start of any DL points to the first byte of screen memory, which is displayed at the top left-hand corner of the screen. By adding the number of bytes used in one mode line (40 bytes in the case of Graphics 0) to the LMS operand bytes we cause the display to move up by one line. Repeating this process makes the display scroll upwards.

Now coarse scrolling is not particularly attractive, and it would be much better if we could scroll over a smaller distance, such as one scan line at a time. The Atari provides the facility to do just this - the register VSCROL at location 54277 (D405 hex). POKEing this register with a number from zero to 16 causes the display to scroll over that number of scan lines. However, when fine scrolling using this register, you must carry out one further step, that is to set the vertical fine scroll bits in the DL. This is done by adding 32 to the instruction code for each mode line you wish to scroll. Unless you do this, altering VSCROL will have no effect. Note that you do not need to set the vertical scroll bit on every mode line, unless of course you want the whole screen to scroll. Once this is done, incrementing VSCROL scrolls the screen upwards, decrementing VSCROL scrolls the screen down.

There is however one snag, which you may already have spotted. VSCROL can only be POKEd with a number of 16 or less. How then do we scroll over a larger distance than 16 scan lines? The solution is in fact quite simple. We fine scroll over the number of scan lines needed to make up one mode line minus one (using VSCROL) then reset VSCROL and complete the scroll by carrying out a coarse scroll. In case that isn't entirely clear (!), Figure 2 should provide additional clarification. I am sure that many of you will have seen this little diagram or something similar in other articles on scrolling, but I repeat it here as it is so useful.

Downward scrolling is achieved by reversal of the process. Set VSCROL initially not to zero but to the number of scan lines making up one mode line (see Table 1) then decrement VSCROL to one. The scroll is completed by decrementing the LMS operand bytes by the appropriate number, resetting VSCROL at the same time.

You can fine scroll from BASIC but the results are not particularly good. Listing 18 is an example. The program first sets the vertical fine scroll bits on every line in the DL (line 40) and then scrolls the display using combined fine and coarse scrolling as described above. Straightaway you will notice a couple of problems. Firstly, if you look carefully you will see that the bottom line of the display does not scroll in properly but jumps into place. This can be avoided very easily by *not* setting the vertical fine scroll bit on the last line of your →

```
UA 10 REM Coarse vertical scroll
YG 20 X=0:Y=0
SV 30 DL=PEEK(560)+256*PEEK(561)
NU 40 POKE DL+4,X:POKE DL+5,Y
AA 50 X=X+40:IF X>255 THEN Y=Y+1:X=X-256
AQ 60 FOR T=1 TO 40:NEXT T
SP 70 GOTO 40
```

Listing 17

```
QU 10 REM Fine vertical scrolling (BASIC)
YG 20 X=0:Y=0
SV 30 DL=PEEK(560)+256*PEEK(561)
SO 40 POKE DL+3,98:FOR J=6 TO 28:POKE DL+
   J,34:NEXT J
NV 50 POKE DL+4,X:POKE DL+5,Y
AJ 60 FOR J=0 TO 7:POKE 54277,J:FOR T=1 T
   O 10:NEXT T:NEXT J
AC 70 X=X+40:IF X>255 THEN Y=Y+1:X=X-256
YZ 80 FOR T=1 TO 10:NEXT T
TA 90 GOTO 50
```

Listing 18

scrolling display (in this case, the bottom line of the screen). This allows the last line to act as a buffer for the next line to scroll in. To see this, change the FOR...NEXT loop in line 40 to read FOR J=6 TO 27, then rerun the program. The last line now scrolls smoothly into place.

Secondly, notice that frequently the screen jumps or flashes. This is an unavoidable effect of fine scrolling from BASIC and occurs when VSCROL is changed while the screen is being drawn. This distracts Antic and causes the unpleasant glitches. The only solution is to change VSCROL during the vertical blank period, which can only be done in machine language. If you now add Listing 19 to Listing 18 you will finally get a smooth fine scroll demonstration. This is a simple VBI routine to scroll the display, and the assembler source code is provided in Listing 20.

This demonstration does however show one last problem associated with vertical fine scrolling. As you watch the display, you will see that every so often the display suddenly changes. This is due to the limitation of Antic's memory counter discussed earlier in this article, namely that it cannot cross a 4K memory boundary. In a real application, if you wished (and you probably would) to scroll over an area of greater than 4K, then one way around the problem would be to organise the screen memory in discrete blocks starting at 4K RAM boundaries. Then, on approaching the end of a 4K block, you would change the LMS operand bytes in the DL to point to the next block, thus resetting the memory counter. Of course, you would have to ensure that the first screen of the new block was the same as the last screen of the previous block or the picture would appear to suddenly change completely!

```
DI 10 REM Fine vertical scroll (M/L)
OK 60 FOR J=0 TO 99:READ BYTE:POKE 1536+J
   ,BYTE:NEXT J
VS 70 X=USR(1536)
UA 80 GOTO 80
SW 100 DATA 104,173,48,2,133,203,173,49,2
   ,133,204,173,97,6,141,5,212,160,4,173
IQ 110 DATA 98,6,145,203,200,173,99,6,145
   ,203,169,6,160,39,162,6,76,92,228,216
SL 120 DATA 24,173,97,6,105,1,201,8,240,9
   ,141,97,6,141,5,212,76,94,6,169
UG 130 DATA 0,141,97,6,141,5,212,24,173,9
   8,6,105,40,160,4,145,203,141,98,6
AB 140 DATA 144,12,24,173,99,6,105,1,200,
   145,203,141,99,6,76,95,228,0,0,0
```

Listing 19

```
10  *=$0600
20 ;equates
30 VSCROL=54277 ;vert. fine scroll regist
er
40 SDLSTL=$230 ;start of display list
50 DLTEMPLO=$CB ;temporary counters
60 DLTEMPHI=$CC
70 SYSVBV=$E45F ;system vbi routine
80 SETVBV=$E45C ;set vbi vector
90 ;initialize
0100  PLA ;no. of args
0110  LDA SDLSTL
0120  STA DLTEMPLO ;lobyte of d.list
0130  LDA SDLSTL+1
0140  STA DLTEMPHI ;hibyte of d.list
0150  LDA FINECO
0160  STA VSCROL ;put 0 into scroll
0170  LDY #4
0180  LDA COARSLO
0190  STA (DLTEMPLO),Y
0200  INY
0210  LDA COARSHI
0220  STA (DLTEMPLO),Y ;point display mem
ory to page zero
0230  LDA #6 ;immediate vbi
0240  LDY #VBROUT&255 ;lobyte
0250  LDX #VBROUT/256 ;hibyte
0260  JMP SETVBV ;enable vbi routine
0270 VBROUT
0280  CLD ;binary arithmetic
0290  CLC ;clear carry
0300  LDA FINECO
0310  ADC #1 ;scroll 1 c.clock
0320  CMP #8 ;too far?
0330  BEQ COARSE ;yes, coarse scroll
0340  STA FINECO ;no, execute scroll
0350  STA VSCROL
0360  JMP EXIT ;return to O.S.
0370 COARSE ;coarse scroll routine
0380  LDA #0
0390  STA FINECO ;reset scroll counter
0400  STA VSCROL ;and register
0410  CLC
0420  LDA COARSLO
0430  ADC #40 ;40 bytes per line
0440  LDY #4
0450  STA (DLTEMPLO),Y
0460  STA COARSLO ;into counter
0470  BCC EXIT ;roll-over of lobyte?
0480  CLC
0490  LDA COARSHI ;yes, inc. hibyte
0500  ADC #1
0510  INY
0520  STA (DLTEMPLO),Y
0530  STA COARSHI
0540 EXIT
0550  JMP SYSVBV
0560 ;temporary counters
0570 FINECO .BYTE 0
0580 COARSLO .BYTE 0
0590 COARSHI .BYTE 0
0600  .END
```

Listing 20

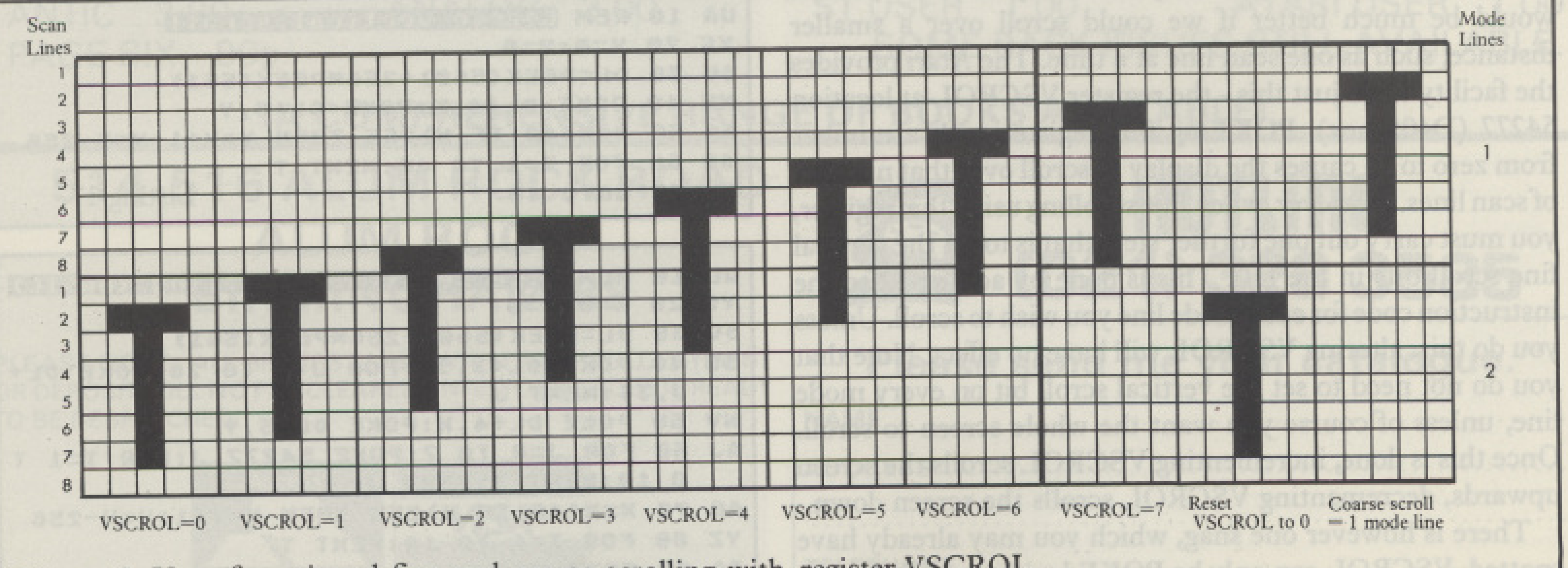


Figure 2. Use of continued fine and coarse scrolling with register VSCROL

As you can see then, more than anything else scrolling demands precise memory management - something you don't normally have to worry much about. This is further emphasised when setting up for horizontal scrolling.

The difficulty is that while graphics mode lines appear completely separate on the screen, they are not so in RAM. The bytes for one line follow directly on from those of the previous line. Thus, if you attempted (for example) to scroll the third line of a screen, the contents of line four would scroll into line three, line five into line four, and so on. However, by organising the screen memory differently it is easy to get around this problem, and horizontal scrolling then becomes easier if anything than vertical scrolling. What you do is direct each line you wish to scroll to its own separate area of memory, and this is done by setting an LMS instruction on each line to be scrolled. As always, an example helps to clarify the position.

Listing 21 arranges for a line of text in Graphics 2 to horizontally coarse scroll across the screen. It first sets up a new DL in page six, then the 6th mode line down is directed to a different memory area (actually page zero) than the rest of the screen by its own LMS code. The 7th mode line is then directed back to the regular screen memory by another LMS instruction. Incrementing the LMS operand low-byte for the 6th mode line causes right-to-left scrolling, and when the end of page zero is reached the pointer is directed back to the start of the page. One point to note here, location 255 is of course the last location in page zero, but since the mode line itself takes 20 bytes, we use 255-20=235 as the limiting point for return to the start of the page. If you look carefully, you can see that the display suddenly changes completely when the return to the start of the page occurs. As an exercise, you might like to arrange this program so that each mode line displays and scrolls a different page in memory. If you get stuck, De Re Atari (page 6-4) contains just such a program to study.

Once memory is arranged in this way, fine scrolling can be implemented in the same fashion as vertical fine scrolling. The register to use is HSCROL (location 54276, D404 hex) which will scroll up to 16 colour clocks horizontally in an identical manner and with the same limitations as VSCROL. To scroll over a large area therefore, we must combine fine and coarse scrolling as before. To effect horizontal fine scrolling, the appropriate lines of the DL must have the horizontal fine scroll bit set (add 16 to the DL mode line instruction). A slight complication is that incrementing HSCROL scrolls the line from left to right, while as we have seen incrementing the LMS operand moves it from right to left. To fine scroll the same demonstration as in Listing 21, we first set HSCROL to eight (Graphics 2 characters are eight colour clocks wide) and decrement HSCROL to do the scroll. Unfortunately, setting HSCROL to eight would move the line one character to the right. To bring the line back to its correct starting position therefore we set the LMS low-byte initially to one rather than zero. To see how this works, add Listing 22 to Listing 21 and rerun the program. Once again, we get those unpleasant glitches, and again we can only get rid of these by scrolling during the vertical blank interval.

```
OU 10 REM Fine horiz. scroll  (BASIC)
WG 50 DATA 112,112,112,71,0,0,7,7,7,7,87,
   0,0,71,0,0,7,7,7,7,7,65,0,6
ZA 155 POKE 54276,8
QI 165 FOR J=8 TO 1 STEP -1:POKE 54276,J:
   FOR X=1 TO 10:NEXT X:NEXT J
CN 180 FOR J=1 TO 10:NEXT J:GOTO 160
```

Listing 22

Before bringing in a VBI routine to do this, let's look at a slightly more practical demonstration. Listing 23 sets up a DL to scroll one line of Graphics 2 text as before, but this time the text is a message that will scroll across the screen. Line 30 reserves some memory (0.5K) to hold our message, and the subroutine at line 270 POKEs the internal character codes of the message, held in A$, into the reserved area. Incidentally, 512 bytes may not sound a lot, but since Graphics 2 screens only use 20 bytes per line you can scroll through the equivalent of 12 screens with the use of just 3K of memory. I believe that Chris Crawford used Graphics 2 for his celebrated 'Eastern Front' map, the surprisingly small amount of memory used in scrolling text modes explains how such a large map and complex program fits into 16K.

Take a look now at lines 300 to 320 where A$ is defined. You will see that the string starts with two blank spaces. Why is this? Well, remember that when vertically scrolling a display we dedicated one mode line to act as a buffer. Setting the horizontal scroll bits in the DL makes Antic take an extra 20% of memory per mode line to act as a scrolling buffer (in the case of a 20-byte line, four extra bytes). On a normal-width playfield, these four bytes - two at each end of the line - are not displayed on the screen, but we have to take them into account all the same. If we didn't do this by starting the scrolling memory area with two extra characters (blanks because we don't want them to be seen) then we would lose the first two characters of the message. Secondly, you will have noticed that the last 20 characters of the string are identical to the first 20 characters. This is because for the purposes of this demonstration we want the message to repeat over and over again. However, directing the display memory back to the start of the message when the end is reached would result in a sudden change in the display. Try changing the last 20 characters of the string to see what I

```
PX 10 REM Coarse horiz. scroll (BASIC)
TA 20 GRAPHICS 2+16:Z=0
NL 30 REM New DL
IK 40 FOR J=0 TO 23:READ X:POKE 1536+J,X:
   NEXT J
MI 50 DATA 112,112,112,71,0,0,7,7,7,7,71,
   0,0,71,0,0,7,7,7,7,7,65,0,6
DE 60 REM POKE in operands for the 3 LMS
   instructions
MW 70 POKE 1540,PEEK(88):POKE 1541,PEEK(8
   9)
SI 80 SCREEN=PEEK(88)+256*PEEK(89)
UV 90 SCRN2=SCREEN+100:HI=INT(SCRN2/256):
   LO=SCRN2-HI*256
IM 100 POKE 1550,LO:POKE 1551,HI
ZE 110 POKE 560,0:POKE 561,6
HJ 120 POSITION 0,4:? #6;"LINE ABOVE AND.
   .."
PB 130 ? #6;"...LINE BELOW DO"
SY 140 ? #6;"NOT SCROLL!"
LM 150 REM Scroll routine follows
LA 160 POKE 1547,Z
FK 170 Z=Z+1:IF Z>235 THEN Z=0
EZ 180 FOR J=1 TO 50:NEXT J:GOTO 160
```

Listing 21

continued overleaf

DISPLAY LISTS continued

```
QM 10 REM Fine horiz. scroll (M/L)
YQ 20 REM Reserve memory for scrolling mesage
ZK 30 RAMTOP=PEEK(106):POKE 106,RAMTOP-2:GRAPHICS 2+16:Z=0
SN 40 REM POKE in the new DL and define memory areas
AU 50 FOR J=0 TO 23:READ X:POKE 1620+J,X:NEXT J
RL 60 DATA 112,112,112,71,0,0,7,7,7,7,87,0,0,71,0,0,7,7,7,7,7,65,84,6
RV 70 POKE 1624,PEEK(88):POKE 1625,PEEK(89)
NH 80 POKE 1632,RAMTOP-2
SJ 90 SCREEN=PEEK(88)+256*PEEK(89)
VH 100 SCRN2=SCREEN+100:HI=INT(SCRN2/256):LO=SCRN2-HI*256
NB 110 POKE 1634,LO:POKE 1635,HI
SH 120 SETCOLOR 4,0,6:SETCOLOR 1,0,14:SETCOLOR 0,13,12
GN 130 POKE 560,84:POKE 561,6
HN 140 POSITION 0,4:? #6;"LINE ABOVE AND..."
PF 150 ? #6;"...LINE BELOW DO"
TC 160 ? #6;"NOT SCROLL!"
SA 170 REM POKE in the VBI routine
QE 180 FOR J=0 TO 68:READ X:POKE 1536+J,X:NEXT J
UV 190 GOSUB 270
CS 200 X=USR(1536)
ME 210 GOTO 210
XU 220 REM Data for VBI
PS 230 DATA 104,169,8,141,4,212,133,203,169,1,141,95,6,133,204,169,6,160,24,162
PB 240 DATA 6,76,92,228,198,203,165,203,201,0,240,6,141,4,212,76,66,6,169,8
IS 250 DATA 141,4,212,133,203,230,204,165,204,201,236,240,6,141,95,6,76,66,6,169
NM 260 DATA 1,133,204,141,95,6,76,95,228
VV 270 REM POKE message into screen memory
KQ 280 POKE 88,0:POKE 89,RAMTOP-2:POKE 87,0
BT 290 DIM A$(256),Z$(1)
SI 300 A$(1,94)=" This is a demonstration of horizontal fine scrolling on the ATARI, using the hardware scroll"
PN 310 A$(95,170)=" register and a vertical blank interrupt routine to ensure smooth scrolling."
TI 320 A$(171,256)=" Any part of the screen memory can be scrolled, as can be seen.  This is a demonstra"
NL 330 SCREEN=PEEK(88)+256*PEEK(89)
GL 340 FOR J=1 TO 256
IE 350 Z1=ASC(A$(J,J)):IF Z1<32 THEN Z2=Z1+64:GOTO 380
GA 360 IF Z1<96 THEN Z2=Z1-32:GOTO 380
CP 370 Z2=Z1
LF 380 POKE SCREEN+(J-1),Z2:NEXT J
GV 390 POKE 88,PEEK(1624):POKE 89,PEEK(1625):POKE 87,2
ZA 400 RETURN
```

Listing 23

mean. The way to avoid this is to make the end of the scrolling memory identical to the start. Then, when the memory pointer is redirected, no apparent change in the display is seen. You should always do this if you want a wraparound display (the same applies to vertical scrolling as well). Finally, the program uses a simple VBI routine to perform the scroll (source code in Listing 24).

Well, that's about it! I have tried to cover (in at least sufficient detail to get you started) the various effects possible by altering and manipulating the display list. I have used many sources for this article, but the most informative were as follows:

De Re Atari (various authors) from Atari Inc. See chapters 2, 5, and 6.

Mapping The Atari by Ian Chadwick, from Compute! books.

Computer Animation Primer by David Fox and Mitchell Waite from Byte Books. See chapters 5, 8, and 9.

First Book of Atari Graphics (various authors) from Compute! Books. See chapter 2.

Tricky Tutorial 1: The Display List from Santa Cruz educational software (manual and cassette/disk).

Your Atari Computer by Lon Poole, Martin McNiff and Steven Cook from Osborne/McGraw Hill. See chapter 9, pp. 294-306.

```
10 ;horiz. scroll vbi routine
20  *=$0600
30 ;equates
40 HSCROL=54276 ;horizontal scroll register
50 FINECO=$CB ;temporary counter
60 LMSLOW=1547 ;LMS operand lo-byte of new DL
70 COARSCO=$CC ;temporary counter
80 SETVBV=$E45C
90 SYSVBV=$E45F
0100 ;initialize
0110  PLA
0120  LDA #8
0130  STA HSCROL ;set register to initial position
0140  STA FINECO
0150  LDA #1
0160  STA LMSLOW ;set LMS lo-byte to 1 rather than zero (see text)
0170  STA COARSCO
0180  LDA #6 ;immediate vbi
0190  LDY #VBROUT&255
0200  LDX #VBROUT/256
0210  JMP SETVBV
0220 VBROUT ;start of vbi routine
0230  DEC FINECO ;decrement fine scroll counter
0240  LDA FINECO
0250  CMP #0 ;fine scroll too far?
0260  BEQ COARSE ;yes, coarse scroll
0270  STA HSCROL ;execute fine scroll
0280  JMP EXIT
0290 COARSE ;coarse scroll routine
0300  LDA #8
0310  STA HSCROL ;reset fine scroll register
0320  STA FINECO ;and temporary counter
0330  INC COARSCO ;increment counter
0340  LDA COARSCO
0350  CMP #236 ;scrolled too far?
0360  BEQ RESET ;yes, reset to start of line
0370  STA LMSLOW ;execute coarse scroll
0380  JMP EXIT
0390 RESET ;reset to start of line
0400  LDA #1
0410  STA COARSCO
0420  STA LMSLOW
0430 EXIT ;back to O.S.
0440  JMP SYSVBV
0450  .END
```

Listing 24

BLOCKBREAKER

by Dave Hitchens

BLOCKBREAKER will run on any Atari 400/800/XL/XE with a minimum of 32k RAM. A paddle will be required plugged into jack 1. The Level 1 playfield appears after about one minute of initialisation. Please note - when RUNning BLOCKBREAKER you should start out with clear RAM. If you have just switched on your machine and loaded in the program all will be well (proving you have typed the program correctly!). Otherwise make sure that you have SAVEd or CSAVEd a copy of the program and then type POKE 580,1 in direct mode and hit RETURN then RESET before loading. This process clears RAM in the same manner as switching off and on does but is kinder to the machine.

THE GAME

Blockbreaker is based on one of the classic computer games in which you have to demolish a wall of bricks using a fast-moving ball directed by your paddle. Simple in concept, the game can nevertheless become very addictive (and not a little frustrating) as you strive to keep the ball in play to beat the current high score. Two types of brick will be noted 'normal' and 'special', the latter identifiable by pulsing colours. Both types have a points value dependant on their position in the wall. Unlike the normal bricks however, hitting one of the 'specials' will give you additional points as displayed on the bonus counter top right and also initiate a stacking routine transferring them out of the playfield area.

STACKING: During this manoeuvre, attempt to strike any remaining special bricks because, in this phase, such hits continue to award the player with bonus points but the bricks themselves remain intact. Since the bonus counter resets each time the ball hits a special brick, BIG points can be amassed using skilful paddle control. As the game progresses a stack of bricks will be formed on the left. Losing a ball during play forfeits a part of this stack. Once the whole wall has been demolished each stacked brick becomes worth 300 additional points. An extra ball is then awarded (up to a maximum reserve of 9) after which the next level commences. There are 8 levels in all. Should you succeed in clearing level 8 (no mean feat), levels 5 to 8 will repeat.

BALL MOTION: The ball has two possible speeds selected automatically during game play and is served by pressing the trigger. In the slow phase only two angles of bounce are possible but during the fast phase, shallow bounce angles will result if the ball is struck closer to the centre of the paddle. These angles will be required in order to gain maximum benefit from the special brick scoring routine and in order to complete a level.

RESTARTING: When you have lost all reserve balls the high score is updated, a good target being in the tens of thousands. Press the START key to begin a new game.

TECHNICAL NOTES

Those of you who just want to play the game do not need to read on but if you are interested in how the program works I have provided some notes on various parts of the program.

Except for the initialising period following loading, together with a brief inter-level sequence, the program runs entirely in machine language. A combination of mainline code with vertical blank and display list interrupts is used. The use of interrupt code results in smooth motion (since graphics objects are moved while the screen is blanked out), the ability to use 4 channel sound independently of other operations and the use of multiple colours.

The mainline code looks after the service initialisation for each ball, updates display features and scoring and takes care of 'normal' brick routines. The VBI is responsible for moving paddle, ball and 'special' bricks during the stacking routine. It also checks for collisions between ball and other playfield objects, monitors sound values and scrolls the high score/copyright message. Twenty two DLI's are incorporated to impart a unique colour to each row of bricks. In this manner up to 40 colours can be displayed on the screen simultaneously. Additionally, the colours themselves are randomised for each new wall.

SOUND: All sound is processed in a vertical blank interrupt. Because the VBI operates independently of the mainline program in a precisely timed manner it is ideal for such use. Blockbreaker's sound is simple but effective - an example is given in Listing 2. Because our VBI operates 50 times per second, each sound pulse requires several passes. In the example given (ball hitting bat), 7 passes are required. Flag1 is the master flag which restarts the routine each time the collision register is set. It does this regardless of whether the routine is currently active from a previous strike or is off. Flag2 simply bypasses the routine if no sound is required.

Location 53768 is very important for sound production although few programmers appear to take advantage of it. The insistent beat heard during initialisation owes its effect to this register. As a demonstration try replacing the '7' in line 310 with a default of '0'. The smoothly descending high pitched note of the falling brick is a result of clocking one sound channel with a much higher frequency to that normally used - location 53768 again.

MOTION: All performed in the VBI in order to achieve smoothness. 'Players' are used to represent ball, bat and falling brick, the latter effect produced as follows. Once the VBI has detected a collision between ball and playfield register 2 (a 'special' brick), the struck brick is replaced by Player 1, the playfield brick image is blanked out and motion of the Player commences. Its image is replaced by a playfield image once the brick has been 'stacked' thereby releasing the sprite for further use. When combining playfield graphics with PMG in this manner reference tables should be kept of related positional values (lines 1530, 1540) - see Listing 3.

THE BALL: Variables (in the sense of memory locations) are used to keep track of the ball and bat X/Y coordinates. Once a collision has been registered, the X coordinate of the left edge of the bat is subtracted from the ball's X position to give a value between 0 and 11. This value is used as an index to two Page 6 tables (lines 1500-1520). The first table determines the ball's reflected angle, a '1' informing the VBI to move the image one 'pixel' both horizontally and vertically on each pass - in other words at 45 degrees. The central table locations are poked with a '2' during play showing we require movement of two pixels vertically on each pass to every one horizontally - that is to say, at a steeper angle. Table 2's value is simply added to the ball's X coordinate so as to move it left or right (adding 255 to the byte being equivalent to subtracting 1). The ball's speed is obtained by simply cycling the above routine once or twice during each VBI pass.

COLOURS: The vertically structured form of the Blockbreaker display is ideal for multiple colour generation by Display List Interrupts. Each DLI (there are 22 of them) selects two colours from tables sited in page 6 of memory. The first colour is POKEd straight into register 53271 and affects the 'normal' bricks. The second colour is incremented by 16 on each DLI pass before POKEing into 53272, the register used for the 'special' bricks, to give the pulsing effect. These two registers correspond to the more commonly used shadow registers at 709 and 710 but when using DLI's we must POKE directly to the GTIA chip. Although 22 DLI'S are operating, because they each perform a similar task, only one master routine is required (see lines 1023 - 1025). All we require is a counter which is incremented in each DLI and which is then used as an index to the colour tables. Since we have a VBI operating we use this to reset our counter to 0 in preparation for the next image. In addition the colour tables are refreshed by the VBI for each new level.

SCROLLING: The information line is scrolled conventionally using register 54276 and the VBI. After a game ends, the score/ hiscore values are compared digit by digit using offsets from the start of the screen memory/ scrolling memory. The latter resides in the unused area set aside for PMG (lines 1006 - 1008). Hiscore is updated when required, by the mainline code which also sets a flag (1680) to allow BASIC to perform its little routine of message selection. (lines 155, 25, 400 - 401). Scrolling continues throughout a game - you don't see the message during play because the routine's memory pointer is reset to a clear area of RAM by a single BASIC poke.

MEMORY MANAGEMENT: Line 1000 sets aside wodges of RAM for Player Missiles Graphics, the redefined character set, the vertical blank code and the mainline code - all these reside in the upper reaches of RAM just beneath RAMTOP and safe from the clutches of BASIC. The unused section of PMG is utilised for the scrolling routine (including the latter's unique VBI - lines 1026-1029), the new display list (lines 1010-1022) and the DLI routine (1023-1025). Most of page 6 contains variables and tables used by the machine code. BASIC has little work to perform once initialisation is complete but its speed is optimised by compacting its code and running the loop (lines 100-585) near the start of the program.

SCREEN PRINTING: Since Blockbreaker requires regular attention to the screen display, a machine code PRINTing routine is incorporated into the mainline code. This sets the cursor to the required location (see listing 3 for example), organises IOCB #6 and then JSR's to CIOV itself. The 6502's Y register temporarily holds the character to be printed (we could use the stack via PHA) and this is transferred to the accumulator in the PRINT routine as required by CIO. See Listing 4.

Listings overleaf

BLOCKBREAKER Assembly Routines

LISTING 2 - Example of sound processing in the VBI.

```
SOUND    LDA FLAG1      ; Set to 1 by the VBI each time bat
                          hit
         BNE BEGIN      ;
         LDA FLAG2      ; Set to non-zero if this routine
                          operating
         BNE ON         ;
         BEQ END        ; Both flags zero so routine not
                          required
BEGIN    LDA #0
         STA 53762      ; Set frequency of channel 1
         LDA #142       ;
         STA NOISE      ; NOISE holds distortion and volume
                          settings
         STA FLAG2      ; Inform VBI that routine now active
         LDA #0         ;
         STA FLAG1      ; Reset master flag for next
                          ball/bat encounter
ON       DEC NOISE      ;
         DEC NOISE      ;
         LDA NOISE      ; Allow sound to decay realistically
                          each pass
         CMP #128       ; Have we reached zero volume yet?
         BNE MAKE       ; Nope!
         LDA #0         ;
         STA FLAG2      ; Yes - reset - finished with
                          routine
MAKE     STA 53763      ; Make noise (at last!)
END                     ; Continue with rest of VBI
                          processing
```

Listing 3. Blanking routine for ball/brick collision.

```
BLANK    LDA SPECIAL    ; Holds Player/Playfield collision
                          value
         STA FLAG4      ; (Used to differentiate
                          normal/special bricks)
         BEQ DISPLAY    ; No brick hit so bypass routine
         LDA TEMPH      ; TEMPH holds X coordinate of ball
                          in PMG terms
         LDX #17        ;
L1       DEX            ;
         CMP 1600,X     ; Use page 6 table to convert X
                          value from PMG system to playfield
                          system
         BCC L1         ;
         STX 85         ; And position the cursor
         STX BRICKH     ; BRICKH holds X coordinate in
                          Playfield values
         LDA TEMPV      ;
         LDX #23        ;
L2       DEX            ;
         CMP 1617,X     ; Do the same in the vertical plane
         BCC L2         ;
         STX SCORE      ;
         STX BRICKV     ;
         STX 84         ; Cursor now over the required brick
         LDY # 0        ;
         JSR PRINT      ; Demolish it!
         LDA WHICH      ; Variable holds ball's vertical
                          direction (1=up, 255=down)
         STA WHICH      ; Reflect the ball
DISPLAY
```

Listing 4. Machine code PRINTing routine.

```
PRINT    LDX #96        ; Select IOCB #6 (6X16) for the
                          screen print
         LDA #11        ; This is the 'PUT' command for CIO
         STA 834,X      ;
         LDA #0         ;
         STA 840,X      ; Set up IOCB for single character
                          printing
         STA 841,X      ;
         TYA            ; We have required character (i,e,
                          its ATASCII code number) into Y
                          reg in main program - transfer
                          here since CIO expects to find it
                          in accumulator
         JSR CIOV       ; Do the job ...
         RTS            ; And return to main program
```



```
CS 1 REM ##########################################
NZ 2 REM #            BLOCKBREAKER               #
FU 3 REM #                 by                    #
WV 4 REM #           DAVE HITCHENS               #
SG 5 REM # ------------------------------------- #
US 6 REM #    Copyright 1985 D.Hitchens          #
HI 7 REM #                                       #
XF 8 REM #  PAGE 6 MAGAZINE - ENGLAND            #
DA 9 REM ##########################################
GA 10 GRAPHICS 17:SOUND 0,0,0,0:Q=310:GOS
   UB 300:POSITION 4,0:? #6;"initialising
        machine code"
TM 20 POKE 710,8:POKE 711,72:POKE 708,228
   :POKE 709,10:DIM A$(16),SCR$(120),CH$(
   34),B$(20),C$(20):LEVEL=0
YT 25 B$="#522%.4♥()'(♥3#/2%└":C$="a♥new♥
   high♥score♥of"
GT 30 GOSUB 1000:GOSUB 1500:GOSUB 1700:GO
   SUB 2000
AH 99 REM CHANGE LEVELS
EZ 100 LEVEL=LEVEL+1:IF LEVEL=9 THEN LEVE
   L=5
HB 105 COLOR 144+LEVEL:PLOT 19,17:POKE 17
   91,1
JT 110 GOSUB 500+LEVEL*10
XM 120 POKE 1714,TOTAL-1
FN 125 POKE VB+308,127-LEVEL*3
BO 130 POKE 1713,0:POKE 1589,1:POKE 1654,
   22:POKE 1587,24:POKE 1670,1
RF 140 Q=315:GOSUB 300:POKE PM+286,109:A=
   USR(MC)
WN 150 IF PEEK(1580) THEN 100
JT 155 Q=310:GOSUB 300:A=USR(MC+721):POKE
   PM+286,120:GOSUB 400+(PEEK(1680)=0)
XV 160 IF PEEK(53279)<>6 THEN 160
AK 170 LEVEL=0:FOR N=2 TO 20:COLOR 0:PLOT
   3,N:DRAWTO 16,N:NEXT N:PLOT 0,0:DRAWT
   O 0,22:GOSUB 1550:GOTO 100
QN 199 REM MISC SUBROUTINES
OH 200 FOR N=X TO Y:COLOR 3:PLOT 3,N:DRAW
   TO 16,N:FOR N1=1 TO 2:COLOR 166:Z=INT(
   13*RND(0)+3):PLOT Z,N:NEXT N1:NEXT N
ZB 201 RETURN
SN 300 RESTORE Q:FOR N=53760 TO 53768:REA
   D D:POKE N,D:NEXT N
WY 310 DATA 20,161,70,166,5,0,106,163,7
XE 315 DATA 0,0,0,0,0,0,0,0,161
ZD 320 RETURN
ZC 400 FOR N=1 TO 19:POKE PM+91+N,ASC(C$(
   N,N)):NEXT N:RETURN
XV 401 FOR N=1 TO 19:POKE PM+91+N,ASC(B$(
   N,N)):NEXT N:RETURN
NF 499 REM DRAW BRICKS
TF 510 X=4:Y=7:GOSUB 200
EZ 515 TOTAL=56:RETURN
QZ 520 X=3:Y=3:GOSUB 200:X=5:Y=9:GOSUB 20
   0
FK 525 TOTAL=84:RETURN
HQ 530 X=3:Y=4:GOSUB 200:X=6:Y=8:GOSUB 20
   0:X=10:Y=12:GOSUB 200
UV 535 TOTAL=112:RETURN
FJ 540 X=3:Y=10:GOSUB 200:X=12:Y=13:GOSUB
   200
VH 545 TOTAL=140:RETURN
RY 550 X=3:Y=4:GOSUB 200:X=6:Y=9:GOSUB 20
   0:X=12:Y=15:GOSUB 200
VJ 555 TOTAL=140:RETURN
UE 560 X=3:Y=6:GOSUB 200:X=9:Y=13:GOSUB 2
   00:X=15:Y=16:GOSUB 200
```

```
XX 565 TOTAL=154:RETURN
VR 570 X=3:Y=3:GOSUB 200:X=5:Y=14:GOSUB 2
   00:X=17:Y=17:GOSUB 200
AL 575 TOTAL=168:RETURN
TE 580 X=3:Y=6:GOSUB 200:X=8:Y=11:GOSUB 2
   00:X=14:Y=18:GOSUB 200
YL 585 TOTAL=182:RETURN
BZ 999 REM CHANGE CHAR SET * SORT P/M
KN 1000 P=PEEK(106):PMB=P-8:PM=PMB*256:CH
   B=P-10:CH=CHB*256:VBB=P-14:VB=256*VBB:
   MCB=P-18:MC=MCB*256
JN 1006 SCR$="                          BLOC
   KBREAKER          PROGRAM AND COPYRIGHT
   ' 1985   DAVE HITCHENS"
JQ 1007 SCR$(LEN(SCR$)+1)="     CURRENT HI
   GH SCORE:   000000 "
TS 1008 FOR N=1 TO 120:POKE PM+N,ASC(SCR$
   (N,N))-32:NEXT N
BA 1010 RESTORE 1015:FOR N=0 TO 3:READ D,
   DT:POKE PM+256+N,D:POKE PM+283+N,DT:NE
   XT N:FOR N=6 TO 26:POKE PM+256+N,134:N
   EXT N
VH 1015 DATA 112,6,112,87,112,0,70,0
IG 1020 POKE PM+260,PEEK(88):POKE PM+261,
   PEEK(89):POKE PM+286,PMB:POKE PM+287,6
   5:POKE PM+288,0:POKE PM+289,PMB+1
ZB 1022 POKE 560,0:POKE 561,PMB+1
HJ 1023 FOR N=0 TO 34:READ D:POKE PM+384+
   N,D:NEXT N
RY 1024 DATA 72,138,72,216,174,254,6,189,
   229,6,24,105,16,157,229,6,141,10,212,1
   41,24,208,189,204,6,141,23,208
AA 1025 DATA 238,254,6,104,170,104,64
TC 1026 FOR N=0 TO 46:READ D:POKE PM+300+
   N,D:NEXT N
WT 1027 DATA 104,162,0,160,55,169,6,32,92
   ,228,96,173,154,6,201,255,208,8,169,7,
   141,154,6,238,29,0
DF 1028 DATA 141,4,212,173,29,0,201,128,2
   08,5,169,0,141,29,0,206,154,6,76,95,22
   8,302,325,331,340
WT 1029 FOR N=1 TO 4:READ D:POKE PM+D,PMB
   +1:NEXT N
DG 1030 RESTORE 1040:FOR N=1 TO 34:READ D
   :CH$(N,N)=CHR$(D):NEXT N:A=USR(ADR(CH$
   ),CHB)
HA 1040 DATA 104,169,0,133,203,133,205,16
   9,224,133,204,104,104,133,206,162,2,16
   0,0
KM 1050 DATA 177,203,145,205,200,208,249,
   230,204,230,206,202,208,242,96
PG 1060 READ DT:IF DT=-1 THEN 1150
PZ 1070 FOR N=0 TO 7:READ D:POKE CH+N+8*D
   T,D:NEXT N:GOTO 1060
XM 1079 REM NEW CHARS
HA 1080 DATA 1,238,238,238,0,187,187,187,
   0
XS 1090 DATA 3,0,127,107,85,107,85,127,0
XZ 1100 DATA 4,110,110,110,0,59,59,59,0
LP 1110 DATA 5,128,128,128,0,128,128,128,
   0
BV 1115 DATA 6,0,127,127,85,85,127,127,0
QM 1118 DATA 7,60,195,219,211,219,195,60,
   0
XM 1120 DATA 16,60,66,66,66,66,66,60,0
FF 1121 DATA 17,24,56,8,8,8,28,62,0
ES 1122 DATA 18,60,70,12,24,48,96,126,0
BI 1123 DATA 19,60,66,2,12,2,66,60,0
MF 1124 DATA 20,12,20,36,68,126,4,4,0
AG 1125 DATA 21,126,64,124,2,2,66,60,0
CG 1126 DATA 22,12,24,48,124,66,66,60,0
SM 1127 DATA 23,126,66,6,12,24,48,96,0
SR 1128 DATA 24,60,66,66,60,66,66,60,0
MX 1129 DATA 25,60,66,66,62,12,24,48,0
ES 1140 DATA -1
YZ 1150 POKE 756,CHB:A=USR(PM+300):FOR N=
   1 TO 2:POKE PM+615+N,224:NEXT N:POKE 7
   04,136:POKE 53256,3
TP 1160 POKE 706,12
ZQ 1165 POKE 707,228:FOR N=PM+955 TO PM+9
   84:POKE N,255:NEXT N
AV 1170 POKE 559,46:POKE 53277,3
GI 1180 POKE 54279,PMB:POKE 623,4
AA 1189 REM VBI DATA
RA 1190 N=0:RESTORE 1220
KU 1200 READ D:IF D=-1 THEN RETURN
EI 1210 N=N+1:POKE VB+N,D:GOTO 1200
NF 1220 DATA 173,7,6,240,71
CM 1230 DATA 172,1,6,192,110,144,13,140,1
   21,6,169,0,141,7,6,145,203,206,44,6
WJ 1240 DATA 173,3,6,201,72,176,8,169,1,1
   41,0,6,141,10,6
FX 1250 DATA 173,3,6,201,185,144,8,169,25
   5,141,0,6,141,10,6
BV 1260 DATA 173,1,6,201,24,176,14,169,25
   5,141,4,6,141,47,6,141,11,6,141,10,6
IG 1270 DATA 173,7,6,240,78,173,47,6,240,
   22,173,6,208,201,1,240,15,141,48,6
EX 1280 DATA 173,3,6,141,49,6,173,1,6,141
   ,50,6
NF 1290 DATA 173,14,208,240,46,201,2,240,
   42,173,3,6,56,237,5,6,170,189,12,6,141
   ,8,6,141,9,6,189,26,6,141,0,6
QQ 1295 DATA 169,1,141,4,6,141,2,6,141,47
   ,6,206,6,6,208,3,238,6,6
TR 1300 DATA 141,30,208,173,7,6,240,78,17
   3,4,6,201,255,240,21
UP 1310 DATA 162,2,172,1,6,177,203,136,14
   5,203,200,200,202,208,246,206,1,6,24,1
   44,18
HN 1320 DATA 162,2,172,1,6,177,203,200,14
   5,203,136,136,202,208,246,238,1,6
MP 1330 DATA 206,9,6,208,19,173,3,6,24,10
   9,0,6,141,3,6,141,2,208,173,8,6,141,9,
   6
ZZ 1335 DATA 206,54,6,173,54,6,240,178
LL 1340 DATA 173,112,2,73,255,201,64,176,
   2,169,64,201,181,144,2,169,181,141,0,2
   08,141,5,6
UR 1350 DATA 238,174,6,173,174,6,201,25,1
   44,20,169,0,141,174,6,248,173,173,6,56
   ,233,1,176,2,169,0,141,173,6,216
OL 1355 DATA 173,11,6,208,7
NW 1360 DATA 173,6,6,201,120,176,12,169,1
   ,133,209,169,2,141,17,6,141,18,6,173,5
   4,6,201,255,208,5,165,209,141,54,6
FV 1365 DATA 216,173,255,6,240,36,169,64,
   141,14,212,162,2,173,10,210,41,246,24,
   105,4,157,204,6,157,229,6
EY 1367 DATA 232,224,23,208,237,169,192,1
   41,14,212,169,0,141,255,6,169,2,141,25
   4,6
HL 1370 DATA 173,10,6,208,7,173,60,6,208,
   20,240,42,169,0,141,0,210,169,20,141,6
   1,6,141,60,6,169,0
JS 1375 DATA 141,10,6,173,61,6,56,233,10,
   141,61,6,173,61,6,201,0,208,5,169,0,14
   1,60,6,141,1,210
RO 1380 DATA 173,2,6,208,7,173,114,6,208,
   20,240,39,169,0,141,2,210,169,142,141,
   63,6,141,114,6,169,0,141,2,6
CU 1385 DATA 206,63,6,206,63,6,173,63,6,2
   01,128,208,5,169,0,141,114,6,141,3,210
JO 1390 DATA 173,115,6,208,7,173,116,6,20
   8,31,240,57,173,10,210,41,15,24,105,2,
   141,6,210,141,116,6,169,1,141,125,6
RV 1395 DATA 169,0,141,115,6,169,169,141,
   117,6,206,125,6,208,23,169,5,141,125,6
   ,206,117,6,173,117,6,201,160,208,5
ES 1397 DATA 169,0,141,116,6,141,7,210
PR 1400 DATA 173,193,2,24,105,16,141,193,
   2,173,198,2,24,105,16,141,198,2
IU 1420 DATA 206,62,6,208,48,169,3,141,62
   ,6,173,56,6,240,38,173,58,6,201,114,17
   6,34,24,105,2,168,162,4,177,205,200
LA 1430 DATA 145,205,136,136,202,208,246,
   238,58,6,152,24,105,140,141,4,210,169,
   173,141,5,210,76,98,228
```

```
OT 1440 DATA 173,57,6,201,48,144,25,141,1
   ,208,206,57,6,169,227,141,4,210,169,3,
   141,5,210,173,58,6,141,120,6,76,98,228
LI 1460 DATA 174,118,6,224,255,208,2,162,
   0,189,81,6,24,105,1,141,119,6,173,120,
   6,205,119,6,144,29,168,162,4,177,205
SD 1465 DATA 136,145,205,200,200,202,208,
   246,206,120,6,169,0,141,4,210,169,14,1
   41,5,210,76,98,228
DG 1470 DATA 172,120,6,169,0,145,205,200,
   145,205,200,145,205,141,5,210,140,59,6
YG 1480 DATA 76,98,228
FN 1490 DATA -1
JL 1499 REM PAGE 0/6 VARIABLES
MI 1500 RESTORE 1510:FOR N=1548 TO 1575:R
   EAD D:POKE N,D:NEXT N
GG 1510 DATA 1,1,1,1,1,1,1,1,1,1,1,1,1,1
YH 1520 DATA 255,255,255,255,255,255,1,1,
   1,1,1,1,1,1
DA 1530 FOR N=0 TO 16:POKE 1600+N,48+8*N:
   NEXT N
XZ 1540 FOR N=0 TO 22:POKE 1617+N,16+4*N:
   NEXT N
JA 1543 FOR N=0 TO 19:READ D:POKE 1716+N,
   D:NEXT N
TA 1546 DATA 162,96,169,11,157,66,3,169,0
   ,157,72,3,157,73,3,152,32,86,228,96
CG 1549 REM MORE VARIABLES
OW 1550 RESTORE 1570
EZ 1560 FOR N=1 TO 31:READ D,DT:POKE D,DT
   :NEXT N
LL 1570 DATA 1538,0,1543,0,1546,0,1547,0,
   1584,0,1587,0,1588,0,1591,0,1592,0,159
   5,0,1596,0,203,0,209,0,205,128
PL 1575 DATA 1700,0,1701,0,1702,0,1703,0,
   1704,0,1705,0,1598,0,1680,0,207,110
MU 1580 DATA 1589,1,1706,1,1707,1,1580,9,
   1640,127,1641,85,1642,127,1661,5
JS 1590 POKE 204,PMB+3:POKE 206,PMB+2:POK
   E 1708,MCB:POKE 208,PMB
TB 1599 REM INSERT VBI
PY 1600 RESTORE 1620:FOR N=1 TO 11:READ D
   :POKE PM+449+N,D:NEXT N:POKE PM+452,VB
   B
KQ 1620 DATA 104,162,0,160,1,169,7,32,92,
   228,96
CG 1695 RETURN
KZ 1699 REM MAINLINE CODE
UC 1700 N=0:RESTORE 1720
BV 1710 READ D:IF D=-1 THEN 2000
YY 1715 POKE MC+N,D:N=N+1:GOTO 1710
CJ 1720 DATA 104,173,44,6,201,1,176,8,169
   ,0,141,53,6,141,44,6,162,7,134,84,162,
   19,134,85,9,144,168,32,180,6
HX 1721 DATA 173,53,6,208,11,173,56,6,208
   ,98,173,123,6,208,93,96
YG 1722 DATA 173,7,6,208,87,173,124,2,208
   ,82,160,50,140,1,6,169,128,145,203,141
   ,6,6,141,173,6,169,2,141,8,6
VG 1725 DATA 141,9,6,169,255,141,4,6,162,
   255,173,10,210,201,128,48,2,162,1,142,
   0,6,41,63,24,105,95
MB 1730 DATA 141,3,6,141,2,208,169,0,133,
   209,133,77,141,47,6,141,11,6,141,30,20
   8,141,121,6,169,1,141,7,6
ET 1735 DATA 141,17,6,141,18,6
ZK 1740 DATA 173,48,6,141,55,6,240,79,173
   ,49,6,162,17,202,221,64,6,144,250,134,
   85,142,45,6,173,50,6,162,23,202
CS 1750 DATA 221,81,6,144,250,142,51,6,14
   2,46,6,134,84,173,48,6,141,115,6,201,4
   ,208,10,173,52,6,208,13,169,1,141,52,6
VC 1755 DATA 160,0,32,180,6,238,177,6,169
   ,0,141,48,6,141,47,6,173,4,6,73,254,14
   1,4,6
NN 1760 DATA 173,51,6,240,110,248,169,24,
   56,237,51,6,141,169,6,173,55,6,201,4,2
   08,15,173,169,6,24,109,173,6,141,169,6
GJ 1765 DATA 169,128,141,173,6,162,3,24,1
   89,163,6,125,166,6,157,163,6,202,208,2
   44
XB 1770 DATA 216,169,0,141,168,6,141,51,6
   ,141,55,6,133,84,169,4,133,85,174,170,
   6,189,163,6,74,74,74,74,9,16,168
DR 1775 DATA 32,180,6
VZ 1780 DATA 174,170,6,189,163,6,41,15,9,
   16,168,32,180,6,238,170,6,174,170,6,22
   4,4,208,219,162,1,142,170,6
SY 1790 DATA 169,0,133,84,169,14,133,85
HJ 1800 DATA 173,173,6,74,74,74,74,9,176,
   168,32,180,6,173,173,6,41,15,9,176,168
   ,32,180,6
FJ 1810 DATA 173,178,6,56,237,177,6,176,1
   6,141,123,6,169,0,141,53,6,141,7,6,172
   ,1,6,145,203
GC 1820 DATA 173,52,6,240,47,173,56,6,208
   ,42,174,46,6,189,229,6,141,193,2,189,8
   1,6,141,58,6,168,162,3
YI 1830 DATA 189,103,6,145,205,200,202,20
   8,247,174,45,6,189,64,6,141,57,6,141,1
   ,208,141,56,6
SQ 1835 DATA 173,59,6,240,35,169,0,141,59
   ,6,133,85,173,118,6,133,84,160,166,32,
   180,6,206,118,6
TY 1837 DATA 208,5,169,1,141,118,6,169,0,
   141,52,6,141,56,6
KI 1840 DATA 173,121,6,240,77,238,118,6,1
   73,118,6,201,23,240,64,133,84,160,0,13
   2,85,140,0,210,32,180,6
DU 1850 DATA 169,15,141,122,6,141,1,210,1
   62,50,160,50,136,208,253,202,208,248,2
   06,122,6,173,122,6,208,235
UN 1861 DATA 238,118,6,206,124,6,173,124,
   6,240,7,173,118,6,201,23,208,200,169,0
   ,141,121,6,141,1,210,206,118,6
IM 1865 DATA 169,2,141,124,6
SZ 1870 DATA 173,123,6,240,69,238,118,6,1
   73,118,6,201,23,240,62,133,84,169,24,1
   41,51,6
JP 1875 DATA 160,0,132,85,32,180,6,238,16
   8,6,238,168,6,238,168,6,169,15,141,126
   ,6
KT 1880 DATA 141,0,210,9,192,141,1,210,16
   2,50,160,150,136,208,253,202,208,248,2
   06,126,6,173,126,6,208,230
FX 1885 DATA 169,0,141,1,210,108,171,6
HB 1890 DATA 206,118,6,173,134,6,240,46,2
   38,44,6,173,44,6,201,9
MJ 1900 DATA 144,5,169,9,141,44,6,169,15,
   141,135,6,141,0,210,9,160,141,1,210,16
   2,100,160,150,136
HO 1910 DATA 208,253,202,208,248,206,135,
   6,173,135,6,208,230,169,0,141,1,210,14
   1,134,6,141,123,6,108,171,6
MK 1920 DATA 104,160,3,200,192,10,240,25,
   177,88,56,241,207,240,244,176,2,144,14
   ,160,4,177,88,145,207
SI 1930 DATA 200,192,10,208,247,140,144,6
   ,96
FL 1950 DATA -1
CM 1995 RETURN
CT 1999 REM SCREEN LAYOUT
YG 2000 A$="ball         level "
DA 2005 POKE 512,128:POKE 513,PMB+1
ZT 2010 COLOR 33:PLOT 2,22:DRAWTO 2,1:DRA
   WTO 17,1
EG 2020 COLOR 36:PLOT 17,2:DRAWTO 17,22
GB 2030 COLOR 37:PLOT 18,1:DRAWTO 18,22
IZ 2040 FOR N=1 TO 16:POSITION 19,N+1:? #
   6;A$(N,N):NEXT N
IB 2045 POSITION 2,0:? #6;"!!+++++++!!!!00
   !!%"
DT 2047 A=USR(PM+450):POKE 53251,200
BS 2048 RETURN
```

contact

ANALOG: Issues 26, 27 and 28 wanted to complete my collection. Please phone Mark Hutchinson on 0232 621221 after 6 p.m.

INDUS GT DISK DRIVE: For sale. Original package as supplied with DOS XL, Spreadsheet, Word Processor and Database software, documentation. Runs all single and double density software. One year old. Excellent condition. £150. Mike Doyle 0509 267992

850 INTERFACE: For sale, little used. Also RTTY receive only unit and DE RE ATARI. £85 the lot. Mr Orme, 66, Valley Rise, Swadlincote, Burton-on-Trent, Staffs. Tel. Burton 221001

HARDWARE FOR TRADE: US Atari user willing to trade hardware. Atari or adaptable to Atari only please. I am looking to add a few odds and ends for my system. Tell me what you have and what you want and I will try and work something out. State 'NEW', 'USED WORKING' or 'USED REPAIRABLE AND PROBLEM'. Sender responsible for postage on what he sends. Receiver responsible for duties on what he receives. Dennis P. Melichar, 7107B Lawrence, Tinker AFB, Oklahoma 73145, U.S.A. Tel. 405-733-5696

AUSTRIAN PEN PAL: My name is Alex Wilson and I live in Vienna, Austria. I own an Atari 800XL and a 1050 disk drive and I am looking for pen-pals around the world to swap tips and ideas with. Please write to Alex Wilson, Brunnerstr. 140/61/6, 1210 Vienna, Austria.

PEN PALS: I would like to write to other Atari users to discuss programming and ideas. I have a 48k 800 and an 800XL with 1050 disk drives. Vaughan Jones, 24, Gresford Way, Little Acton, Wrexham, Clwyd, LL12 8BB

NORTHAMPTON ST USER GROUP: Anyone who would like to form an ST User Group in NORTHAMPTONSHIRE, please contact Paul Taylor, 97, Shelley Street, Northampton, NN2 7HZ or ring 0604 717801.

EPSON MX80 PRINTER FOR SALE: EPSON MX80 MK III with Graftrax chips. £125 o.n.o. Phone Bob on 01 577 6568

WS 2000 MODEM FOR SALE: Boxed as new with manuals etc. £120 only! Can be sold with two disks of software and interface for any Atari, be up and running for £20 extra. Ring Bryan on 0298 78071.

WEST YORKSHIRE ATARI OWNERS CLUB: WYACO caters for the growing numbers of Atari owners in this area with informal meetings, a newsletter, exhibition trips, discounts and a problem 'help-line'. The subscription is £9, a once only fee to cover postage expenses, printing, telephone etc. Full details and application forms are available from Rod Baker, WYACO Club, 28, Brooklyn Court, Cleckheaton, BD19 4TJ. Tel. 0274 875288 daytime or 0924 472046 evenings.

1010 FOR SALE: Atari 1010 Program Recorder including dust cover. Unwanted gift. £20 inc. postage. S.R. Fallaize, 1a, Cranleigh Drive, Leigh-on-Sea, Essex, SS9 1SX

ATARI ROOTS: I am desperate to get hold of a copy of the book 'Atari Roots' which is now out of print. If anyone has a copy for sale, please write or phone. Len Lawson, 100, Barons Road, Bury St. Edmunds, Suffolk, IP33 2LY. Tel. 0284 702373

WS2000 MODEM FOR SALE: With Viewterm modem interface, suitable for XL Atari computers. Unwanted Christmas gift. Unused and still in original box. £150 the lot. Phone C.Saunders 01 422 2375

MICROVITEC 1451 RGB TTL MONITOR: Exchange for Atari compatible hardware, anything considered. Note that the monitor is not Atari 8-bit compatible. Contact Steve Asbury on 021 747 6326 Monday, Wednesday and Friday evenings 6 p.m. to 8 p.m.

ATARI USERS!: C-MOS is the bi-monthly Atari Users newsletter with news, reviews, adventure etc. 80p (inc. p&p) for a sample copy or £4 for 1 years subscription. Specially recommended for games enthusiasts. Send to Alan Wheatley, 48, Cameron Crescent, Buckie, Banffshire, Scotland.

ANALOG WANTED: Issues 28,29, 30 and 31 wanted in excellent/ mint condition. Please state price including postage. John Hayes, 142, Sandhurst Road, Edmonton, London, N9 8BG

WORTHING ATARI BBS: After an unforseen closure in August, WABBS is now back on line on a new phone number - 0903 503711. WABBS is an Atari based system running on an 800XL with 2 drives and an updated version of Forem called UltraForem which uses SmartDos and Basic XL. On line 24 hours on a ringback system - let the phone ring once, hang up and phone back within 1 minute. Sysop - Roy.

RAM PACKS: Two 16k RAM packs (CX 853) unused, still in box. Offers please. Also printer wanted suitable for direct connection to Atari. Pete Cunningham, 11, Berwyn Avenue, Penyffordd, Chester, CH4 0HS. Tel. 0978 760172

PAGE 6 BACK ISSUES: The following reader requires copies of Issues 1 and 2. Derek Ross, 117 Moss-side Road, Shawlands, Glasgow, G41. Tel. 041 632 5737

DE RE ATARI: For sale, as new. £10. Phone Histon 4057.

PENPALS WANTED: I would like to make new friends with anyone in the U.K. U.S.A., Europe, Canada or Australia. I have a 130XE, 1050 disk drive. Please write to David Morgan, 85, Walter Road, Ammanford, Dyfed, South Wales, Gt. Britain. Tel. 0269 3266

THE WEDGE: Has anyone got a copy of COMPUTE! for MAY 1983? I want the article and listing by Michael Hepner of the updated version of The Wedge. Photocopies will suffice. T.C. Mayers, 241, Avenue Road Extension, Leicester. Tel. Leicester 707206

CLOSE ASSAULT: Can any help me to run the cassette version of this game on an 800XL? Pete Lock, 101, Clapham Terrace, Leamington Spa, Warwicks, CV31 1JE

PRESTON ATARI CLUB: PACE now meets on the second Wednesday of each month at Ingol Labour Club, Whitby Avenue, Ingol, Preston. Meetings start at 7.30 p.m.

BULLETIN BOARD/DATARI: Can anyone please tell me how to find a Bulletin Board who works with Datari's interface? Ronald Hallberg, Serenadgatan 22, 214 72 MALMO, Sweden.

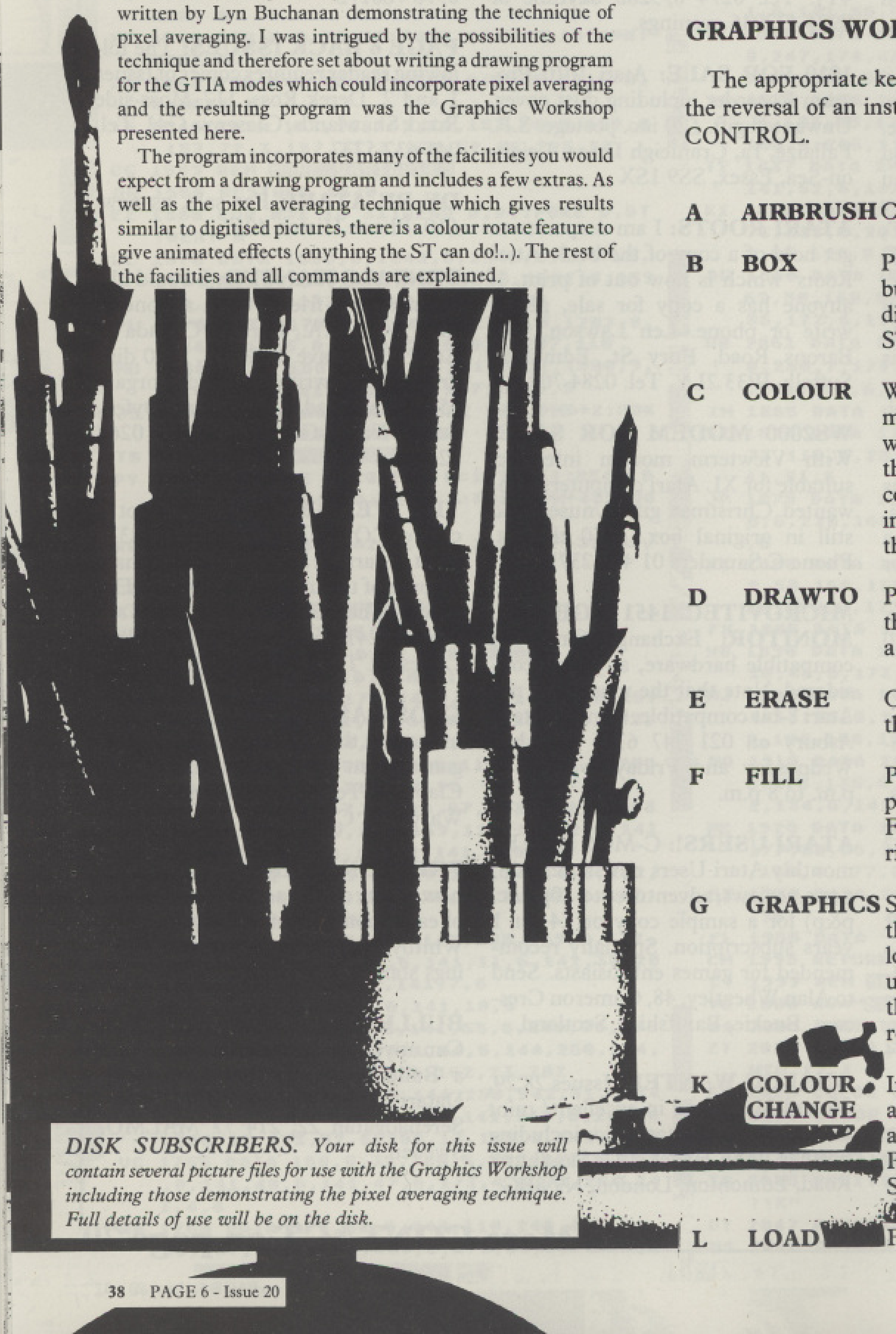
More CONTACT on page 70

GRAPHICS WORKSHOP

by Allan Knopp

In ANTIC magazine, June 1985 there was a program written by Lyn Buchanan demonstrating the technique of pixel averaging. I was intrigued by the possibilities of the technique and therefore set about writing a drawing program for the GTIA modes which could incorporate pixel averaging and the resulting program was the Graphics Workshop presented here.

The program incorporates many of the facilities you would expect from a drawing program and includes a few extras. As well as the pixel averaging technique which gives results similar to digitised pictures, there is a colour rotate feature to give animated effects (anything the ST can do!..). The rest of the facilities and all commands are explained.



DISK SUBSCRIBERS. Your disk for this issue will contain several picture files for use with the Graphics Workshop including those demonstrating the pixel averaging technique. Full details of use will be on the disk.

GRAPHICS WORKSHOP COMMANDS

The appropriate keypresses are indicated. In many cases the reversal of an instruction is to press the same key with CONTROL.

A	**AIRBRUSH**	CTRL A to end.
B	**BOX**	Position cursor to one corner, press Fire button to plot point, move cursor to diagonally opposite corner and press START.
C	**COLOUR**	Will change the background colour in modes 9 and 11. Use the joystick. Forward will decrease by 16 thus keeping the same luminence but changing the colour. Left will decrease by 1, right will increase by 1. Press START to return to the drawing.
D	**DRAWTO**	Plot one end of line, move the cursor to the other end and press START to draw a line between the two.
E	**ERASE**	Clears the graphics screen. Answer Y to the prompt to clear the screen.
F	**FILL**	Plot top left, move to bottom left and press START. This is the standard XIO FILL over the background from left to right until it hits a pixel which is lit.
G	**GRAPHICS**	Select modes 9, 10 or 11 without clearing the screen. The colour selection bar looks a little odd in graphics 10 but just use the top 8 blocks (colours 1 to 8) plus the background (colour 0), ignore the rest.
K	**COLOUR CHANGE**	In graphics 10, colours 0 to 8 are available. Select which colour you wish to alter and use the joystick to change. Press SELECT for another colour, START to return to the drawing.
L	**LOAD**	From disk or cassette.

M **MOVE CURSOR SLOWLY** For detailed work. CTRL M to end.

N **NO BAR** This will remove the colour bar from the right hand side of the screen. CTRL N will replace it.

O **CIRCLE** Plot the centre bottom of the circle, move the cursor vertically to the centre and press START. You will not be able to plot a circle which extends off the screen, you will get an error message and be asked to try again.

P **PIXEL AVERAG-ING** This is the routine which appeared in ANTIC, June 1985. It is really only intended to be used in Graphics 9 although some interesting effects can be obtained in 10 and 11. It has the effect of softening hard edges and smoothing contours. Once the routine is started, it cannot be stopped until it has finished, except by pressing RESET and losing the picture. Once the screen has been completely converted, it is possible to retouch it and add text.

R **ROTATE COLOURS** This can be used only in graphics 10. It enables you to rotate colours through the colour registers to give some animation to your picture. It is possible to rotate through any of the nine registers, including the background. The registers must however be consecutive.

S **SAVE** To disk or cassette.

T **TEXT** Print text to the screen, one character at a time. Position the cursor and select the colour before pressing T. To cancel press CTRL T and RETURN.

W **WIDE BRUSH** CTRL W to end.

UP ARROW MOVE CURSOR SELECTOR UP

DOWN ARROW MOVE CURSOR SELECTOR DOWN

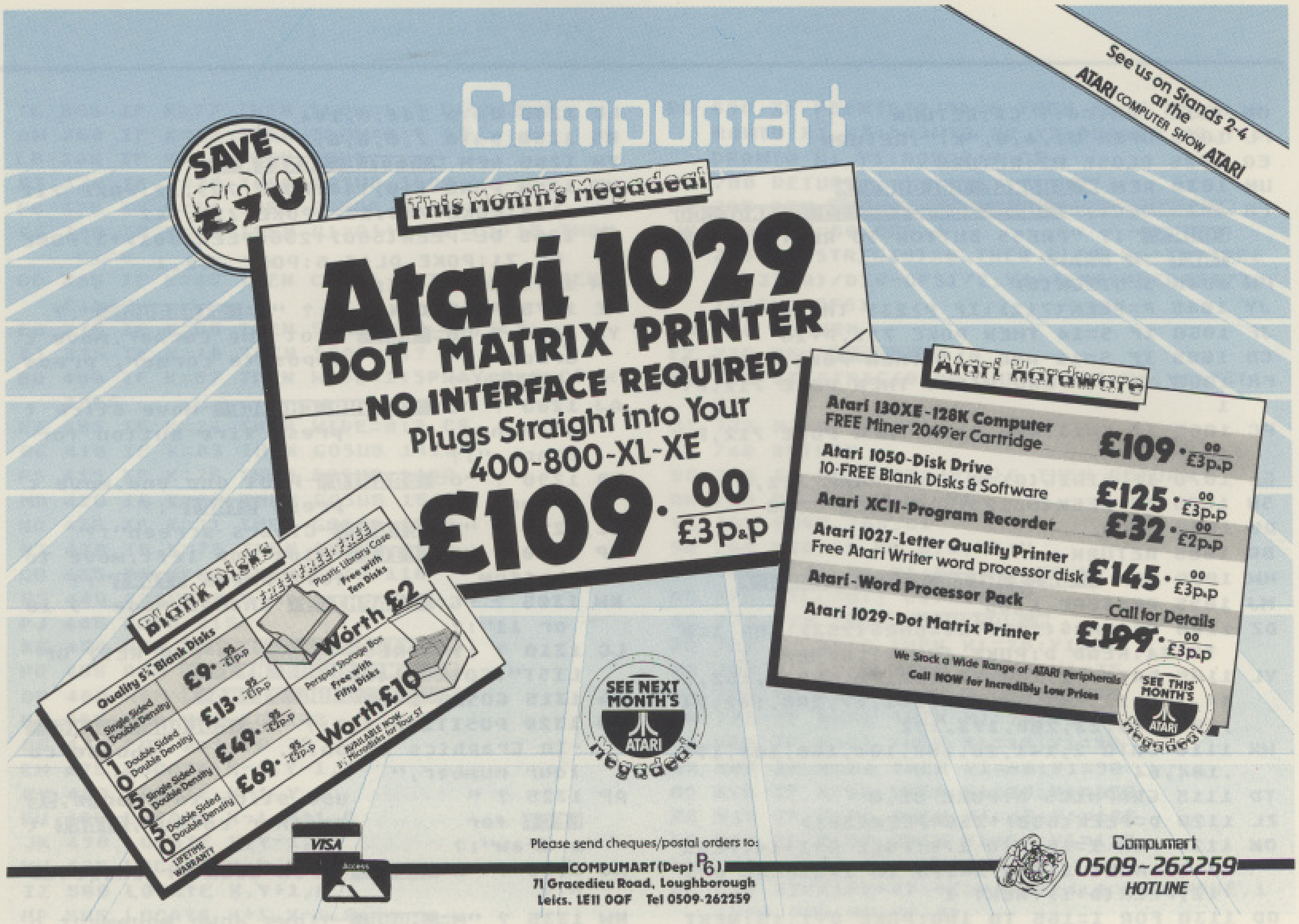
1 - 9 JUMP CURSOR Will position cursor instantly at the relevant point on the screen.

That's it. I would be pleased to see any pictures you have drawn with the Graphics Workshop. Please send them in to the Editor and he will send them on. All disks or cassettes will be returned.

```
CS 1 REM ##########################################
XK 2 REM #        GRAPHICS WORKSHOP              #
FU 3 REM #                by                     #
NM 4 REM #            ALLAN KNOPP                #
SG 5 REM # ------------------------------------- #
XD 6 REM #  PAGE 6 MAGAZINE - ENGLAND            #
CY 7 REM ##########################################
QM 100 REM
OJ 105 GOTO 160
LL 110 ? C$;"* LOWEST COLOUR NUMBER ":INP
   UT LC:IF LC<0 OR LC>7 THEN 110
UD 115 ? C$;"* HIGHEST COLOUR NUMBER ":IN
   PUT HC:IF HC>8 OR HC<1 THEN 115
HX 120 ? C$;"*PRESS START TO END ":? "JOY
   STICK TO CONTROL SPEED"
LK 125 TEMP=PEEK(704+LC)
VT 130 FOR I=704+LC TO 704+HC:POKE I,PEEK
   (I+1):NEXT I
UY 135 POKE 704+HC,TEMP
TW 140 IF PEEK(53279)=6 THEN ? C$:GOTO 21
   5
QI 145 IF STICK(0)=14 THEN WW=WW+1
RF 150 IF STICK(0)=13 THEN WW=WW-1:IF WW<
   1 THEN WW=1
RR 155 FOR W=1 TO WW:NEXT W:GOTO 125
OM 160 DIM C$(1),B$(1),FILL$(20),SPRAY$(2
   0),BOX$(20),LINE$(20),CIRCLE$(20),SLOW
   $(20),TEXT$(50),L$(10),L1$(20),SC$(40)
LP 165 DIM WIDE$(20),MOVE$(6),FILE$(20),Y
   N$(1)
US 170 FILL$="* FILL MODE ":SPRAY$="* AIR
   BRUSH MODE ":BOX$="* BOX MODE ":LINE$=
   "* DRAWTO MODE "
LA 175 CIRCLE$="* CIRCLE MODE ":SLOW$="*
   SLOW CURSOR ":SC$="* PIXEL AVERAGING
   PLEASE WAIT!":WIDE$="* WIDE BRUSH "
MH 180 C$=CHR$(125)
LI 185 GOSUB 1255:GOSUB 1090
KW 190 GOSUB 1475:GOSUB 1160
SP 195 GOSUB 1020
PB 200 TRAP 1565
HI 205 X1=38:Y1=80
PT 210 C1=15:GOSUB 840
IH 215 S=STICK(0)
AK 220 IF STRIG(0)=0 AND WIDE=0 THEN YY=1
HO 225 XX=1
FJ 230 IF STRIG(0)=1 AND SLOW=0 THEN YY=4
   :XX=3
ZI 235 IF STRIG(0)=1 AND SLOW=1 THEN YY=1
   :XX=1
GF 240 IF S=14 THEN Y1=Y1-YY
EP 245 IF S=13 THEN Y1=Y1+YY
BQ 250 IF S=11 THEN X1=X1-XX
YP 255 IF S=7 THEN X1=X1+XX
MY 260 IF S=6 THEN Y1=Y1-YY:X1=X1+XX
LL 265 IF S=5 THEN Y1=Y1+YY:X1=X1+XX
PB 270 IF S=10 THEN Y1=Y1-YY:X1=X1-XX
PL 275 IF S=9 THEN Y1=Y1+YY:X1=X1-XX
RF 280 GOSUB 830:GOSUB 560
GG 285 IF PEEK(764)=255 THEN 215
HK 290 GET #2,K
AR 295 IF K=65 THEN SPRAY=1:WIDE=0:? C$;S
   PRAY$
MD 300 IF K=1 THEN SPRAY=0:? C$
GU 305 IF K=68 THEN DRAW=1:SPRAY=0:? C$;L
   INE$
BN 310 IF K=4 THEN DRAW=0:? C$
IZ 315 IF K=66 THEN BOX=1:SPRAY=0:? C$;BO
   X$
LH 320 IF K=2 THEN BOX=0:? C$
DT 325 IF K>=49 AND K<=57 THEN GOSUB 780
FL 330 IF K=67 THEN GOSUB 1030
JL 335 IF K=70 THEN FILL=1:? C$;FILL$
XE 340 IF K=6 THEN FILL=0:? C$
WU 345 IF K=79 THEN CIRCLE=1:SPRAY=0:? C$
   ;CIRCLE$
XY 350 IF K=15 THEN CIRCLE=0:? C$
```

```
TE 355 IF K=77 THEN SLOW=1:? C$;SLOW$
AW 360 IF K=13 THEN SLOW=0:? C$
LB 365 IF K=84 THEN TEXT=1
RI 370 IF K=78 THEN GOSUB 1680
FC 375 IF K=14 THEN GOSUB 1140
PG 380 IF K=61 THEN C1=C1+1:IF C1>15 THEN
    C1=0
OD 385 IF K=45 THEN C1=C1-1:IF C1<0 THEN
    C1=15
EO 390 IF K=80 THEN SCAN=1:? C$;SC$
EI 395 IF K=16 THEN SCAN=0:? C$
BQ 400 IF K=87 THEN WIDE=1:SPRAY=0:? C$;W
    IDE$
EZ 405 IF K=23 THEN WIDE=0:? C$
HG 410 IF K=83 THEN GOSUB 1420
PS 415 IF K=76 THEN GOSUB 1490
MB 420 IF K=69 THEN GOSUB 1540
NQ 425 IF K=71 THEN GOSUB 1580
NZ 430 IF K=75 THEN GOSUB 1615
QB 435 IF K=82 THEN GOTO 110
VS 440 GOSUB 840
PJ 445 GOTO 215
KE 450 REM * PIXEL AVERAGING *
PQ 455 REM *  LYN BUCHANAN   *
DP 460 REM * ANTIC JUNE '85  *
KI 465 FOR Y=1 TO 172
DG 470 FOR X=1 TO 75
EM 475 LOCATE X-1,Y-1,A
KY 480 LOCATE X-1,Y,B
EU 485 LOCATE X-1,Y+1,C
JK 490 LOCATE X,Y-1,D
XW 495 LOCATE X,Y,E
IZ 500 LOCATE X,Y+1,F
HP 505 LOCATE X+1,Y-1,G
NP 510 LOCATE X+1,Y,H
HX 515 LOCATE X+1,Y+1,I
XF 520 K=INT((A+B+C+D+E+F+G+H+I)/9)
GR 525 COLOR K:PLOT X,Y
JH 530 POKE 77,0
VE 535 NEXT X:NEXT Y
JK 540 SOUND 0,65,14,14
JU 545 FOR W=1 TO 50:NEXT W
SO 550 SOUND 0,0,0,0:SCAN=0:? C$;"DONE":R
    ETURN
NB 555 REM * SET LIMITS *
JJ 560 IF X1<3 THEN X1=75
MM 565 IF X1>75 THEN X1=3
ZN 570 IF Y1<3 THEN Y1=172
IS 575 IF Y1>172 THEN Y1=3
CJ 580 COLOR C1
UZ 585 IF SPRAY=1 THEN 705
EP 590 IF FILL=1 THEN 725
HH 595 IF FILL=2 THEN 745
JG 600 IF STRIG(0)=0 AND DRAW=0 THEN GOSU
    B 650
FR 605 IF DRAW=1 THEN 660
GM 610 IF DRAW=2 THEN 670
JJ 615 IF BOX=1 THEN 685
KC 620 IF BOX=2 THEN 695
VQ 625 IF CIRCLE=2 THEN 865
PB 630 IF CIRCLE=1 THEN 850
SL 635 IF TEXT=1 THEN GOSUB 960
YR 640 IF SCAN=1 THEN 450
ZZ 645 RETURN
XM 650 IF WIDE=1 THEN PLOT X1,Y1-3:DRAWTO
     X1,Y1+4:YY=4:RETURN
FM 655 PLOT X1,Y1:RETURN
MS 660 IF STRIG(0)=0 THEN PLOT X1,Y1:X2=X
    1:Y2=Y1:DRAW=2
AD 665 RETURN
ZJ 670 REM * DRAWTO & BOX *
KI 675 IF PEEK(53279)=6 THEN PLOT X1,Y1:D
    RAWTO X2,Y2:DRAW=0:? C$
ZS 680 RETURN
GB 685 IF STRIG(0)=0 THEN PLOT X1,Y1:X2=X
    1:Y2=Y1:BOX=2
ZU 690 RETURN
DU 695 IF PEEK(53279)=6 THEN PLOT X1,Y1:D
    RAWTO X1,Y2:DRAWTO X2,Y2:DRAWTO X2,Y1:
    DRAWTO X1,Y1:BOX=0:? C$
ZD 700 RETURN
LZ 705 REM * AIRBRUSH - ANTIC OCT '84 *
UX 710 DIV=50:OFS=4
DM 715 IF STRIG(0)=0 THEN PLOT X1+INT(PEE
    K(53770)/DIV-OFS)/2,Y1+(INT(PEEK(53770
    )/DIV)-OFS)
ZH 720 RETURN
EZ 725 REM * FILL *
PV 730 IF STRIG(0)=0 THEN PLOT X1,Y1:FILL
    =2
JT 735 X2=X1:Y2=Y1
ZL 740 RETURN
DO 745 IF PEEK(53279)<>6 THEN RETURN
QN 750 POSITION X1,Y1
YE 755 POKE 765,C1
SN 760 XIO 18,#6,0,0,"S:"
SL 765 PLOT X1,Y1:DRAWTO X2,Y2
DC 770 FILL=0:? C$:RETURN
SC 775 REM * JUMP CURSOR *
OO 780 IF K=49 THEN X1=20:Y1=35
NI 785 IF K=50 THEN X1=40:Y1=35
OW 790 IF K=51 THEN X1=60:Y1=35
NM 795 IF K=52 THEN X1=20:Y1=90
OH 800 IF K=53 THEN X1=40:Y1=90
OX 805 IF K=54 THEN X1=60:Y1=90
OO 810 IF K=55 THEN X1=20:Y1=125
RE 815 IF K=56 THEN X1=40:Y1=125
SS 820 IF K=57 THEN X1=60:Y1=125
MN 825 GOSUB 830:RETURN
VI 830 XI=X1*2+47:YI=Y1/2+14:A=USR(MOVE,1
    ,PMB,PMD,XI,YI,3)
ZZ 835 RETURN
KG 840 A=USR(MOVE,0,PMB,PME,195,C1*5+15,5
    )
AB 845 RETURN
FW 850 REM * CIRCLE *
YB 855 IF STRIG(0)=0 THEN PLOT X1,Y1:X2=X
    1:Y2=Y1:CIRCLE=2
ZQ 860 RETURN
SZ 865 IF PEEK(53279)=6 THEN GOTO 875
ZS 870 RETURN
ES 875 PHI=0:YY1=0:XX1=Y2-Y1
HP 880 PHIY=PHI+YY1+YY1+1
PZ 885 PHIXY=PHIY-XX1-XX1+1
FA 890 PLOT X1+XX1/3.5,Y1+YY1
IH 895 PLOT X1-XX1/3.5,Y1-YY1
FH 900 PLOT X1-XX1/3.5,Y1+YY1
GS 905 PLOT X1+XX1/3.5,Y1-YY1
DP 910 PLOT X1+YY1/3.5,Y1+XX1
GW 915 PLOT X1-YY1/3.5,Y1-XX1
FL 920 PLOT X1+YY1/3.5,Y1-XX1
FE 925 PLOT X1-YY1/3.5,Y1+XX1
GJ 930 PHI=PHIY
IX 935 YY1=YY1+1
ZR 940 IF ABS(PHIXY)<ABS(PHIY) THEN PHI=P
    HIXY:XX1=XX1-1
HM 945 IF XX1>=YY1 THEN 880
ZM 950 ? C$:CIRCLE=0:GOTO 870
PG 955 REM * PLOT CHARACTER *
KW 960 ? C$;" TYPE CHARACTER ":INPUT L1$
BH 965 IF L1$="●" THEN 1015
CF 970 FOR L=1 TO LEN(L1$):L$=L1$(L,L):LX
    =X1:LY=Y1:GOSUB 980
IG 975 NEXT L
WE 980 L$=L$(1,1):LA=ASC(L$):COLOR C1
MM 985 IF X1>67 THEN X1=67
XF 990 IF Y1>160 THEN Y1=160
TY 995 FOR L9=0 TO 14:LZ1=57088+LA*8+(L9/
    2):LZ1=PEEK(LZ1)
VX 1000 FOR L8=7 TO 0 STEP -1:LZ2=INT(LZ1
    /2)
ZD 1005 IF LZ2*2<LZ1 THEN PLOT X1+L8,Y1+L
    9
BZ 1010 LZ1=LZ2:NEXT L8:NEXT L9
```

```
ON 1015 TEXT=0:? C$:RETURN
FL 1020 OPEN #2,4,0,"K:":RETURN
EO 1025 CLOSE #2:RETURN
UN 1030 REM * CHANGE COLOURS *
FN 1035 ? C$;"* USE JOYSTICK TO CHANGE CO
LOURS ":? "PRESS BUTTON TO RESTORE - S
TART TO DRAW"
PW 1040 S=STICK(0)
JY 1045 P=PEEK(712):IF P>239 THEN P=0
JF 1050 IF S=14 THEN POKE 712,P+16
CB 1055 IF S=11 AND P>1 THEN POKE 712,P-1
FX 1060 IF S=7 AND P<254 THEN POKE 712,P+
1
PC 1065 IF S=13 AND P>16 THEN POKE 712,P-
16
GL 1070 IF STRIG(0)=0 THEN POKE 712,0
SN 1075 IF PEEK(53279)<>6 THEN 1040
DV 1080 ? C$
BR 1085 RETURN
HW 1090 REM * GR.9 WITH TEXT WINDOW *
MJ 1095 RESTORE 1105
DZ 1100 C$=CHR$(125):B$=CHR$(253):FOR I=0
 TO 34:READ D:POKE 1536+I,D:NEXT I
YL 1105 DATA 72,138,72,152,72,169,0,162,1
44,160,12,141,10,212,141,27,208,142,24
,208,140,23,208,173,192
WX 1110 DATA 2,141,26,208,104,168,104,170
,104,64
TD 1115 GRAPHICS 8:POKE 82,0
ZL 1120 D=PEEK(560)+256*PEEK(561)
ON 1125 FOR I=167 TO 170:POKE D+I+14,PEEK
(D+I):NEXT I:FOR I=173 TO 175:POKE D+I
+12,PEEK(D+I):NEXT I
QD 1130 FOR I=165 TO 180:POKE D+I,15:NEXT
 I:POKE D+190,0:POKE D+180,128:POKE 51
2,0:POKE 513,6:POKE 54286,192
YK 1135 POKE 623,64:POKE 87,9:N=PEEK(16)-
128:IF N>=0 THEN POKE 16,N:POKE 53774,
N
LV 1140 CC=0:FOR X=0 TO 150 STEP 10:FOR Y
=0 TO 4:COLOR CC:PLOT 78,X+Y:DRAWTO 79
,X+Y:NEXT Y:CC=CC+1:NEXT X
JN 1145 COLOR 6:PLOT 76,0:DRAWTO 76,170:I
F PEEK(623)<>160 THEN POKE 704,144
PA 1150 POKE 752,1
BK 1155 RETURN
ZL 1160 REM * P.M. MOVE SUBROUTINE *
DF 1165 REM * TOM HUDSON - ANALOG  *
JZ 1170 RESTORE 1220
PQ 1175 DIM PMMOV$(100),P1$(30),P0$(30):M
OVE=ADR(PMMOV$):FOR X=1 TO 100:READ N:
PMMOV$(X)=CHR$(N):NEXT X
PI 1180 FOR X=1 TO 3:READ N:P1$(X)=CHR$(N
):NEXT X:FOR X=1 TO 5:READ N:P0$(X)=CH
R$(N):NEXT X
TU 1185 PMBASE=INT((PEEK(145)+3)/4)*4:POK
E 54279,PMBASE
JX 1190 PMB=PMBASE*256
AG 1195 PMD=ADR(P1$):PME=ADR(P0$)
AC 1200 POKE 559,46:POKE 53277,3
ZH 1205 POKE 705,42:POKE 707,136:REM PLAY
ER COLOURS
AG 1210 RETURN
WE 1215 REM * P.M. MOVE DATA *
LZ 1220 DATA 216,104,104,104,133,213,104,
24,105,2,133,206,104,133,205,104,133,2
04,104,133,203,104,104,133,208
CC 1225 DATA 104,104,133,209,104,104,24,1
01,209,133,207,166,213,240,16,165,205,
24,105,128,133,205,165,206,105
TI 1230 DATA 0,133,206,202,208,240,160,0,
162,0,196,209,144,19,196,207,176,15,13
2,212,138,168,177,203,164
UX 1235 DATA 212,145,205,232,169,0,240,4,
169,0,145,205,200,192,128,208,224,166,
213,165,208,157,0,208,96
PY 1240 REM * PLAYER IMAGE DATA *
LD 1245 DATA 144,0,144
NS 1250 DATA 7,6,6,6,7
YW 1255 REM * TITLE SCREEN *
ME 1260 POKE 710,144:POKE 709,12:POKE 712
,144:POKE 708,132:POKE 711,142
BD 1265 DL=PEEK(560)+256*PEEK(561)+3:POKE
 DL,71:POKE DL+3,6:POKE 752,1
ZW 1270 GOSUB 1410
XE 1275 POSITION 2,3:? "A= AIRBRUSH ":?
YG 1280 ? "B= BOX -Plot one corner,move c
ursor to        opposite corner, press
 START":?
AJ 1285 ? "C= COLOUR CHANGE -Move stick t
o change        press fire button for
black.":?
IB 1290 ? "D= DRAWTO -Plot one end,move c
ursor,          press START":?
YC 1295 ? "E= ERASE -Clears screen":?
PP 1300 ? "F= FILL -Plot top left,move to
 bottom         left,press START":?
NW 1305 ? "G= GRAPHICS -Change mode- 9 10
 or 11":?
LC 1310 ? :? "PRESS START TO FOR REST OF
LIST":GOSUB 1400
AA 1315 GOSUB 1410
BO 1320 POSITION 2,3:? "K= COLOUR CHANGE
-In Graphics 10 only,         choose co
lour number,"
AP 1325 ? "                use stick to change,SE
LECT for        another colour,START t
o draw":?
HO 1330 ? "L= LOAD -From disk or cassette
":?
NW 1335 ? "M= MOVE -Slows down movement o
f cursor"
DN 1340 ? "N= NO BAR -Removes colour sele
ctor bar        press CTRL N to replac
e.":?
DT 1345 ? "O= CIRCLE -Plot bottom of circ
le,move         cursor vertically to c
entre           press START":?
DV 1350 ? "P= PIXEL AVERAGING ":?
LD 1355 ? "PRESS START FOR REST OF LIST":
GOSUB 1400
ZV 1360 GOSUB 1410
SR 1365 POSITION 2,3:? "R= ROTATE COLOURS
 ":?
DA 1370 ? "S= SAVE -To disk or cassette":
?
TA 1375 ? "T= TEXT -Position cursor, plot
 one            letter at a time. CTRL
 T will         end before plotting"
HP 1380 ? :? "W= WIDE BRUSH ":?
EQ 1385 ? "↑= MOVE COLOUR SELECTOR UP ":
? :? "↓= MOVE COLOUR SELECTOR DOWN ":
?
HU 1390 ? "1 to 9= JUMP CURSOR ":? :? :?
"PRESS CTRL AND KEY TO CANCEL FUNCTION
"
KO 1395 ? :? "PRESS START TO BEGIN"
RC 1400 IF PEEK(53279)<>6 THEN 1400
BB 1405 RETURN
SP 1410 ? "K":POSITION 2,0:? "graphics wo
rkshop -BY ALLAN KNOPP"
BE 1415 RETURN
LQ 1420 REM * SAVE SCREEN *
EE 1425 ? C$;" FILENAME -eg. D1:FILENAME.
EXT or C:":TRAP 1565
QV 1430 INPUT FILE$:IF FILE$="C:" OR FILE
$="C" THEN GOTO 1460
AD 1435 OPEN #1,8,0,FILE$
PZ 1440 POKE 850,11:POKE 852,PEEK(88):POK
E 853,PEEK(89):POKE 856,128:POKE 857,2
8
AO 1445 I=USR(ADR(MOVE$))
DW 1450 FOR I=0 TO 8:PUT #1,PEEK(704+I):N
EXT I
```

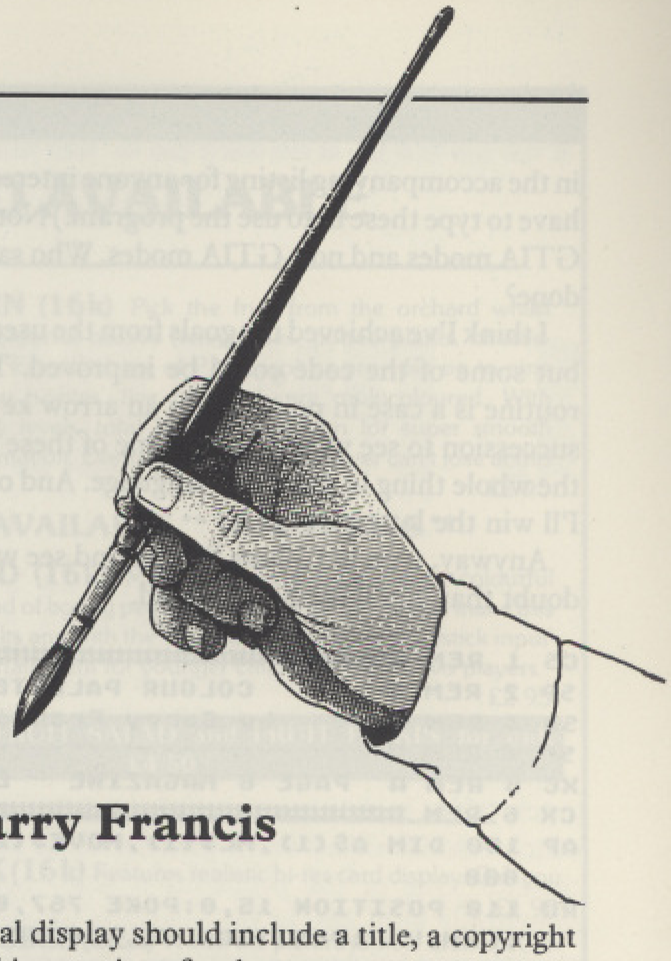


GRAPHICS WORKSHOP continued

```
TO 1455 GOTO 1470
MN 1460 ? "PRESS PLAY & RECORD THEN RETUR
   N"
RE 1465 OPEN #1,8,128,"C:":GOTO 1440
WT 1470 CLOSE #1:POKE 54286,192:? C$:? "
   DONE !":RETURN
UD 1475 REM * MOVE$ *
UU 1480 RESTORE 1485:FOR I=1 TO 6:READ A:
   MOVE$(I,I)=CHR$(A):NEXT I:RETURN
DI 1485 DATA 104,162,16,76,86,228
EI 1490 REM * LOAD SCREEN *
SX 1495 ? C$;" FILE TO LOAD? -D:FILENAME.
   EXT or C:":TRAP 1565
MD 1500 INPUT FILE$:IF FILE$="C:" OR FILE
   $="C" THEN GOTO 1530
XS 1505 OPEN #1,4,0,FILE$
FM 1510 POKE 850,7:POKE 852,PEEK(88):POKE
    853,PEEK(89):POKE 856,128:POKE 857,28
AH 1515 I=USR(ADR(MOVE$))
GD 1520 FOR I=0 TO 8:GET #1,A:POKE 704+I,
   A:NEXT I
XA 1525 CLOSE #1:POKE 54286,192:? C$:? "
   DONE !":RETURN
PD 1530 ? "PRESS PLAY THEN RETURN":OPEN #
   1,4,129,"C:":TRAP 1565
QW 1535 GOTO 1510
OR 1540 ? C$;"*CLEAR SCREEN  ARE YOU SURE
   ? Y/N":INPUT YN$
DJ 1545 IF YN$<>"Y" THEN ? C$:RETURN
PX 1550 ? #6;C$
GV 1555 GOSUB 1140:RETURN
NV 1560 REM * TRAP ERRORS *
XE 1565 TRAP 40000:POKE 54286,192:? C$;"K
       ERROR ";PEEK(195);" AT LINE ";PEE
   K(186)+PEEK(187)*256
SJ 1570 ? "     MAKE ADJUSTMENT AND TRY A
   GAIN"
FC 1575 FOR W=1 TO 200:NEXT W:? C$:TRAP 1
   565:CLOSE #1:POKE 54286,192:GOTO 215
DB 1580 REM * GRAPHICS 9 or 11 *
US 1585 ? C$;"Which mode do you want- 9,1
   0 or 11?":INPUT G
JK 1590 IF G=9 THEN POKE 623,64:POKE 712,
   0:POKE 704,144
ME 1595 IF G=10 THEN POKE 623,160:POKE 70
   4,0
JJ 1600 IF G=11 THEN POKE 623,192:POKE 71
   2,8:POKE 704,144
XA 1605 ? C$:K=0:RETURN
JJ 1610 REM *CHANGE GR.10 COLOURS *
LX 1615 ? C$;"* SELECT COLOUR NUMBER-0 TO
    8":INPUT K
KT 1620 IF K<0 OR K>8 THEN 1615
JM 1625 P=PEEK(704+K)
QF 1630 S=STICK(0)
MV 1635 IF S=14 THEN P=P+1
NK 1640 IF S=13 THEN P=P-1
II 1645 IF P>255 THEN P-1
BC 1650 IF P<1 THEN P=255
ES 1655 POKE 704+K,P
ZK 1660 PK=PEEK(53279)
NC 1665 IF PK=5 THEN 1615
BH 1670 IF PK=6 THEN ? C$:RETURN
SW 1675 GOTO 1630
GW 1680 COLOR 0:PLOT 76,0:DRAWTO 76,174:P
   LOT 78,0:DRAWTO 78,170:PLOT 79,0:DRAWT
   O 79,170:RETURN
```

□

COLOUR PALETTE



by Garry Francis

When it comes to computer graphics, the Atari 400/800/XL/XE micros are the undisputed leaders in the 8-bit field. Any idiot with two eyes and a brain can see that! (Unfortunately, that rules out one-eyed Commodore 64 and Apple owners.)

And what makes the Atari so superior to the others? Well, there's the large scale custom integrated circuits that make it all possible. There's the colour indirection from a palette of 256 colours. There's the 6 character graphics modes and the 11 bit-mapped graphics modes which can be mixed and matched anyway you like through custom display lists. There's the operating system's built-in drawing commands. There's the page flipping and the redefinable character set. There's the display list interrupts and the vertical blank interrupts. There's the inimitable Atari player-missile graphics which make animation such a cinch. There's the hardware controlled horizontal and vertical fine scrolling. And there's the pure fascination and excitement of having so much graphics potential at your fingertips!

However, all this graphics power is useless to you unless you have the tools and knowledge to use it. I can't give you the knowledge (that comes from reading every Atari magazine, book and technical manual that you can get your hands on), but I can provide you with a useful tool.

The accompanying program is a colour selection utility that I wrote some years ago and have found invaluable ever since. Simply type in the program, check it with TYPO III and save a copy before running. You don't need any instructions. Everything you need to know is presented on the screen.

When typing the program in, be careful of the funny strings in lines 1080 and 1160-1180. I must apologise for these. I wouldn't normally submit a program full of funny characters because I know how hard they are to type in. Unfortunately, I didn't have time to change them.

DESIGN NOTES

Colour Palette is a very interesting program from a programmer's point of view because of the sheer number of different graphics techniques used in such a short program. I had intended to describe these in some detail, but as I said above, I just ran out of time. You'll have to settle for the following sketchy notes.

Firstly, you should understand that Colour Palette was not just slapped together overnight, but was 'designed'. I gave a lot of thought to the best way to present a colour selection utility and what was the simplest and most intuitive way to use it. I eventually came up with the following goals:

- Any program initialisation should be instantaneous (or as near as possible).
- The initial display should include a title, a copyright notice and instructions for the user.
- The crux of the display should show all 128 colours on the screen at once. (It is not necessary to show the 256 colours available in GRAPHICS 9 as this mode is rarely used and the screen is simply not big enough to display them all adequately.)
- All the colours should be separated by black dividers to avoid colour bleeding.
- The 'current' colour should be clearly identified by a cursor which is shaped so as not to obscure the colour underneath. The cursor's colour should alternate between black and white (i.e. flash) so as not to get lost amongst all the other colours.
- The user should be able to select any colour by simply moving the cursor about with a joystick.
- It should be possible to use the keyboard as an alternative to the joystick in case you don't have a joystick (highly unlikely), the joystick is busted or not plugged in or you simply prefer using the keyboard. The arrow keys are the obvious choice for cursor movement, but it shouldn't be necessary to press the CONTROL key unless you really want to.
- Whenever the cursor moves, the value of the new colour should be displayed immediately. It should not be necessary to confirm a selection by (say) pressing the fire button. The colour values should be shown as both POKE values and SETCOLOR values.
- The cursor should have a short delay after the first move, but should speed up on the following moves until the joystick or arrow keys are released.
- The program should be crashproof.
- And finally, it should be fun to use!

The end product uses a plethora of different graphics techniques including player-missile graphics and super fast string manipulation using some fairly standard tricks. The custom display list incorporates character graphics, bit-mapped graphics, blank scan lines and multiple display list interrupts. The latter are synchronised during the vertical blank interrupt. (The assembly language routines are shown →

in the accompanying listing for anyone interested. You do not have to type these in to use the program.) Note the mixture of GTIA modes and non-GTIA modes. Who said it couldn't be done?

I think I've achieved my goals from the users' point of view, but some of the code could be improved. The auto-repeat routine is a case in point. Press an arrow key twice in quick succession to see what I mean. One of these days I'll rewrite the whole thing in assembly language. And one of these days I'll win the lottery too...

Anyway, type in Colour Palette and see what you think. I doubt that you'll be disappointed.

```
CS 1 REM ##################################
SP 2 REM #         COLOUR PALETTE         #
SA 3 REM #       by Garry Francis         #
SF 4 REM # ------------------------------ #
XC 5 REM #   PAGE 6 MAGAZINE - ENGLAND    #
CX 6 REM ##################################
AP 100 DIM A$(1),ML$(1),MOVE$(27):GOSUB 1
   000
RU 110 POSITION 15,0:POKE 767,0:? HUE;","
   ;LUM;" ":POSITION 33,0:POKE 767,0:? 16
   *HUE+LUM;"  "
BY 120 IF PEEK(20)<4 THEN 120
VR 130 SOUND 0,0,0,0
HB 140 IF PEEK(20)<DELAY THEN 140
XQ 150 DELAY=5:GOSUB 160:GOTO 110
PC 160 S=STICK(0):IF S<>15 THEN POKE 20,0
   :POKE 77,0:K=0:GOTO 200
DG 170 SKSTAT=PEEK(53775):IF SKSTAT<>243
   AND SKSTAT<>251 THEN DELAY=20:GOTO 160
XA 180 POKE 20,0:K=PEEK(53769):IF K>127 T
   HEN K=K-128
EY 190 IF K>63 THEN K=K-64
ZV 200 IF S=14 OR K=14 THEN LUM=LUM-2+16*
   (LUM=0):GOSUB 250:RETURN
IJ 210 IF S=13 OR K=15 THEN LUM=LUM+2-16*
   (LUM=14):GOSUB 250:RETURN
RX 220 IF S=7 OR K=7 THEN HUE=HUE+1-16*(H
   UE=15):GOSUB 260:RETURN
VK 230 IF S=11 OR K=6 THEN HUE=HUE-1+16*(
   HUE=0):GOSUB 260:RETURN
OD 240 GOTO 160
UN 250 SOUND 0,25,10,8:SRCE=DEST:DEST=PMB
   ASE+542+5*LUM:A=USR(ADR(MOVE$),SRCE,DE
   ST):RETURN
GO 260 SOUND 0,25,10,8:POKE 53248,50+10*H
   UE:RETURN
KN 1000 GRAPHICS 11:POKE 16,0:POKE 53774,
   0:POKE 559,0:POKE 709,28:POKE 710,0:PO
   KE 712,0:POKE 752,1:POKE 83,39
SS 1010 DL=PEEK(560)+256*PEEK(561):POKE D
   L+3,70:POKE DL+6,10:POKE DL+7,2
UB 1020 FOR I=DL+8 TO DL+93 STEP 17:POKE
   I,176:NEXT I:POKE DL+106,79:POKE DL+10
   7,PEEK(DL+100):POKE DL+108,PEEK(DL+101
   )
KR 1030 FOR I=DL+99 TO DL+101:POKE I,15:N
   EXT I:FOR I=DL+112 TO DL+146 STEP 17:P
   OKE I,176:NEXT I
UL 1040 POKE DL+147,2:POKE DL+148,65:POKE
    DL+149,PEEK(560):POKE DL+150,PEEK(561
   )
YQ 1050 POKE 87,1:POSITION 3,0:? #6;"colo
   ur palette":POKE 87,0:POSITION 6,1:? "
   COPYRIGHT 1983 Garry Francis"
VB 1060 VVTP=PEEK(134)+256*PEEK(135):STAR
   P=PEEK(140)+256*PEEK(141):DM=PEEK(88)+
   256*PEEK(89):OFFSET=DM+80-STARP
WP 1070 HI=INT(OFFSET/256):LO=OFFSET-256*
   HI:POKE VVTP+2,LO:POKE VVTP+3,HI:POKE
```



```
   VVTP+6,0:POKE VVTP+7,20
FN 1080 A$="♥♥♥rr|  33┤Deuu/f♦ww◢C|◣X A
   A KC]] n♦)▶":A$(7,7)=CHR$(34):A$(5120)
   ="▶":A$(41)=A$
ES 1090 DM=DM+5200:HI=INT(DM/256):LO=DM-2
   56*HI:POKE 88,LO:POKE 89,HI
FK 1100 POSITION 0,0:? "MOVE CURSOR WITH
   JOYSTICK OR CURSOR KEYS":HUE=8:LUM=8
LB 1110 START=PEEK(106)-4:POKE 54279,STAR
   T:PMBASE=256*START:DEST=PMBASE+542+5*L
   UM:POKE 704,0:POKE 705,0:POKE 623,1
SS 1120 FOR I=DEST TO DEST+3:READ A:POKE
   I,A:NEXT I:DATA 60,36,36,60
ZY 1130 FOR I=PMBASE+678 TO PMBASE+738 ST
   EP 10:FOR J=I TO I+7:POKE J,255:NEXT J
   :NEXT I
BE 1140 POKE 53275,1:POKE 53248,50+10*HUE
   :POKE 53249,50:POKE 53256,0:POKE 53257
   ,0:POKE 204,15
JD 1150 OFFSET=65536-STARP+1536:HI=INT(OF
   FSET/256):LO=OFFSET-256*HI:POKE VVTP+1
   0,LO:POKE VVTP+11,HI:POKE VVTP+14,109
CI 1160 POKE VVTP+15,0:ML$="h█ ▀/)\ \d♦)♥
   .K)) ▄♥ FL%LP ). .L-@ |I_ @ |LbdH)A ◣T ⌐P)
   9▄♥ |h@HfK%KH◣EO%N▄"
OR 1170 ML$(70)="◣T +P ┘PhI\Ph)Y▄♥ |h@H)♥E
   O%N ◣T ┘P) | ⌐Ph@"
AO 1180 MOVE$="hh.Nh.Mh.Ph.O ┘1M.O)♥.M/ ♦U
   ♦"
HJ 1190 POKE 512,41:POKE 513,6:A=USR(1536
   ):POKE 54286,192:POKE 53277,2:POKE 559
   ,42:POKE 16,64:POKE 53774,64
IW 1200 GOSUB 160:POSITION 0,0:POKE 767,0
   :? "    SETCOLOR X,       POKE YYY,
      ":RETURN
```

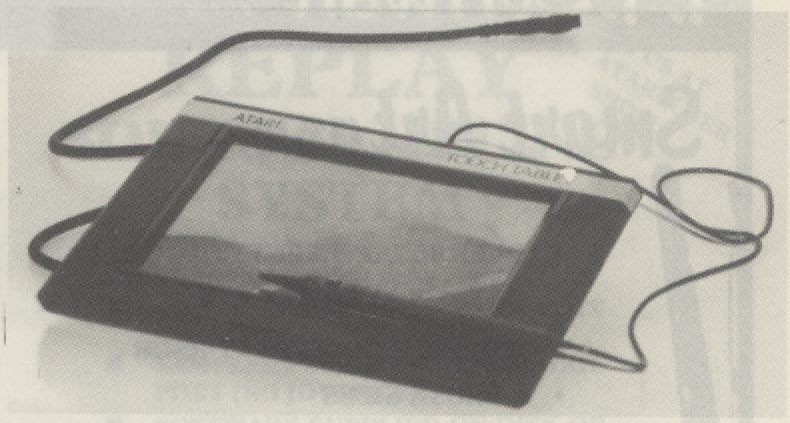
Colour Palette Assembly Listing

```
0100 ;########################################
0110 ;# INTERRUPT SERVICE ROUTINES  #
0120 ;#     FOR COLOUR PALETTE      #
0130 ;#      by Garry Francis       #
0140 ;#       Copyright 1983        #
0150 ;########################################
0160 ;
0170 ;SYSTEM EQUATES
0180 ;
0190 DRKMSK=$4E ;Dark Attract Mask
0200 COLRSH=$4F ;Attract Colour Shifter
0210 VDSLST=$0200 ;Display List Interrupt Vector
0220 PCOLR0=$02C0 ;Shadow of COLPM0
0230 COLPM1=$D013 ;Player 1 Colour Register
0240 COLBK=$D01A ;Background Colour Register
0250 PRIOR=$D01B ;Priority Control Register
0260 WSYNC=$D40A ;Wait for Horizontal Sync
0270 SETVBV=$E45C ;Vector to set VBI
0280 XITVBV=$E462 ;Vector to normal deferred VBI
0290 ;
0300 ;LOCAL EQUATES
0310 ;
0320 LUMIN=$CB ;Luminance of COLPM1 & COLBK
0330 COUNT=$CC ;Countdown timer for flashing cursor
0340 SOURCE=$CD ;Source address of cursor image
0350 DESTIN=$CF ;Destination address of cursor image
0360 ;
0370 ;SET THE DEFERRED VBI VECTOR
0380 ;
0390 ;Call from BASIC with X=USR(1536)
0400 ;
0410  *=$600 ;Origin
0420  PLA ;Remove no. of arguments from stack
0430  LDY #MYVBI&255 ;LSB of my VBI
0440  LDX #MYVBI/256 ;MSB of my VBI
0450  LDA #7 ;Indicates deferred VBI
0460  JSR SETVBV ;Do it
0470  RTS ;Return to BASIC
0480 ;
0490 ;VBI SERVICE ROUTINE
0500 ;
0510 ;Resets luminance to zero, resets DLI vector
0520 ;and alternates cursor between black and white.
0530 ;
0540 MYVBI LDA #0 ;Reset luminance counter
0550  STA LUMIN
0560  LDA #DLI1&255 ;Reset DLI vector
0570  STA VDSLST
0580  DEC COUNT ;Decrement frame counter
0590  LDA COUNT
0600  BNE EXIT ;Exit unless zero
0610  LDA #15 ;Reset frame counter
0620  STA COUNT
0630  LDA PCOLR0 ;Flash cursor
0640  EOR #14
0650  STA PCOLR0
0660 EXIT JMP XITVBV ;Exit via normal deferred VBI
0670 ;
0680 ;DLI SERVICE ROUTINES
0690 ;
0700 ;DLI1 sets upper bits of PRIOR to enable GTIA
0710 ;modes, then changes DLI vector to DLI2.
0720 ;
0730 DLI1 PHA
0740  LDA #$C1 ;Set for GTIA (GR.11)
0750  STA WSYNC
0760  STA PRIOR
0770  LDA #DLI2&255 ;Change DLI vector
0780  STA VDSLST
0790  PLA
0800  RTI
0810 ;
0820 ;DLI2 increments the luminance of Player 1
0830 ;and the background & does colour shifting
0840 ;if attract mode is on.  When luminance
0850 ;reaches maximum, DLI vector is changed
0860 ;to DLI3.
0870 ;
0880 DLI2 PHA
0890  INC LUMIN ;Increment luminance
0900  LDA LUMIN
0910  PHA ;Save it for later
0920  ASL A
0930  EOR COLRSH ;Do colour shifting
0940  AND DRKMSK ;Lop off upper bit of luminance
0950  STA WSYNC
0960  STA COLPM1 ;Update luminance of Player 1
0970  STA COLBK ;Update luminance of background
0980  PLA
0990  CMP #7 ;Reached limit yet?
1000  BNE SKIP
1010  LDA #DLI3&255 ;Change DLI vector
1020  STA VDSLST
1030 SKIP PLA
1040  RTI
1050 ;
1060 ;DLI3 sets the priority for no GTIA modes
1070 ;and resets background to black.
1080 ;
1090 DLI3 PHA
1100  LDA #0 ;Reset background
1110  EOR COLRSH ;Attract stuff as above
1120  AND DRKMSK
1130  STA WSYNC
1140  STA COLBK
1150  LDA #$01 ;Set for no GTIA
1160  STA PRIOR
1170  PLA
1180  RTI
1190 ;
1200 ;ROUTINE TO MOVE CURSOR VERTICALLY
1210 ;
1220 ;Routine is fully relocatable.  Assembled to
1230 ;this area for convenience only.
1240 ;Call from BASIC with X=USR(ADR(ML$),SRCE,DEST)
1250 ;where ML$ is this routine
1260 ;      SRCE is the source address
1270 ;      DEST is the destination address
1280 ;
1290  PLA ;Remove no. of arguments from stack
1300  PLA ;Source address
1310  STA SOURCE+1
1320  PLA
1330  STA SOURCE
1340  PLA ;Destination address
1350  STA DESTIN+1
1360  PLA
1370  STA DESTIN
1380  LDY #3 ;Set index
1390 LOOP LDA (SOURCE),Y ;Move cursor image
1400  STA (DESTIN),Y
1410  LDA #0 ;Clear old image
1420  STA (SOURCE),Y
1430  DEY
1440  BPL LOOP ;Continue for 4 bytes
1450  RTS ;Return to BASIC
1460  .END
```

□

Touch Tablet Utilities

1. PICLOADA



by Paul Lay

One of the nice things about Atari Artist used with the touch tablet is that it saves pictures in a 'compacted' form which enables many more pictures to be stored on disk or cassette. One of the problems is that this format is not compatible with any of the available programs for loading pictures into your own programs. Up to now this has meant that your picture has had to be saved in 'Micropainter' format by using the INSERT key whilst in DRAW mode and every picture no matter whether simple or complex would take 62 sectors on a disk. I wanted to write a game which required many pictures and so had to find a way to use the 'compacted' format. Here then you have the inside story about Atari Artist's compaction technique together with a program (which runs in machine code) to load pictures into your own programs. Later I will provide a routine to use with this program which will allow you to add more colours to your picture.

The first point to note about the compaction technique is that there are two different modes of screen access, vertical and horizontal.

Vertical access: If we consider the screen as being divided into 40 columns (or bytes) then we access one column at a time, starting at the first row and move down every other row until we reach the bottom of the screen. We then return to the top of the column and begin with the second row moving down every other row again until we reach the bottom before moving to the next column.

Horizontal access: This simply scans across rows from left to right.

So how do we know which format to use? In every PIC file saved by Atari Artist the 8th byte in the file indicates the mode (1=vertical, 2=horizontal). From there bytes 14 to 18 hold the values for the colour registers 708 to 712 before the actual screen data begins at byte 28. Note that, of the first 27 bytes, only those described are actually used. The others appear redundant other than a length count which it is not necessary to use. The compacted screen data takes the following form:

OP	DATA	OP	DATA	OP	~	OP	DATA

1 byte — variable length — end of file

OP can define three different operations:

OP=0:

The data field for this operation is three bytes long and takes the form

hi	low	byte

hi and low form a 16 bit value (256*hi+low).

The action to be taken here is to store 'byte' in the next (256*hi+low) screen locations.

OP<=128 (but obviously>0):

In this case the data field is just one byte long

byte

This is similar to OP=0 but is effectively an 8 bit version as the action taken is to store 'byte' in the next 'OP' screen locations.

OP>128:

In this case the data field is OP-128 bytes long

Byte 1	byte 2	byte3	~	byte OP-128

Here the action taken is to store the OP-128 bytes in the next OP-128 screen locations.

Note that in all three modes the 'next' byte is determined by whatever screen access mode we are in.

The whole picture from byte 28 to the end of the file is then stored as a series of 'OP's and their data fields. The OP used is dependant on the number of pixels of the same colour (or bytes of the same value) in each row or column of the screen.

The PICLOADA program can be used in conjunction with your own BASIC programs (as a subroutine). The original version was in BASIC but was somewhat slow so this is version two which is in machine code to load a picture as fast as Atari Artist. The program will prompt you for a filename (you must use the device name) and will then set up an ANTIC #E display list before loading in the picture. Once loaded you may press any key to load another picture.

The main body of the machine code is relocatable and is therefore stored in a BASIC string, although a couple of routines have to be stored in page 6. In fact the main code is 244 bytes long and the routines in page 6 occupies 158 bytes. The routine can easily be called from BASIC by the following command:

<var>=USR(ADR(CODE$),ADR(FILENAME$))

where CODE$ contains the main body of the machine code routine and FILENAME$ contains the filename of the compacted picture. Lines 10 to 630 of the program set up the machine code routine while the rest of the program demonstrates how the routine should be used by loading in compacted screens specified by the user.

```
CS 1 REM ################################
UN 2 REM #          PICLOADA            #
YT 3 REM #   A Touch Tablet Utility     #
ZW 4 REM #             by               #
TC 5 REM #          PAUL LAY            #
SH 6 REM # ---------------------------- #
XE 7 REM #  PAGE 6 MAGAZINE - ENGLAND   #
CZ 8 REM ################################
CY 9 GRAPHICS 0:? "INITIALISING...."
KO 10 FOR I=1536 TO 1693:READ J
QX 20 POKE I,J:NEXT I
DX 30 DIM CODE$(244)
NA 40 FOR I=1 TO 244:READ J
JY 50 CODE$(I)=CHR$(J):NEXT I
PA 60 DATA 142,153,6,140,154,6,162
WC 70 DATA 16,169,7,157,66,3,169
CQ 80 DATA 0,157,72,3,157,73,3
BP 90 DATA 32,86,228,172,154,6,174
SQ 100 DATA 153,6,96,141,152,6,142
BN 110 DATA 153,6,140,154,6,160,0
UN 120 DATA 145,203,174,151,6,202,208
JX 130 DATA 8,238,208,0,238,208,0
CR 140 DATA 208,3,238,207,0,173,208
LE 150 DATA 0,201,192,208,5,169,1
AS 160 DATA 141,208,0,201,193,208,8
AY 170 DATA 169,0,141,208,0,238,207
GU 180 DATA 0,173,207,0,201,40,208
KS 190 DATA 8,169,0,141,207,0,238
RF 200 DATA 208,0,165,88,133,203,165
DT 210 DATA 89,133,204,162,39,165,203
HL 220 DATA 24,109,208,0,133,203,165
VV 230 DATA 204,105,0,133,204,202,16
HC 240 DATA 239,165,203,24,109,207,0
KI 250 DATA 133,203,165,204,105,0,133
FU 260 DATA 204,172,154,6,174,153,6
RW 270 DATA 173,152,6,96,0,0,0
BV 280 DATA 0,83,58,155
EV 290 DATA 162,96,169,12,157,66,3
JC 300 DATA 32,86,228,162,96,169,3
YZ 310 DATA 157,66,3,169,155,157,68
YW 320 DATA 3,169,6,157,69,3,169
AJ 330 DATA 12,157,74,3,169,8,157
AG 340 DATA 75,3,32,86,228,173,48
PI 350 DATA 2,133,203,173,49,2,133
NS 360 DATA 204,169,78,160,3,145,203
ES 370 DATA 160,99,145,203,169,14,160
WB 380 DATA 6,145,203,200,192,99,208
VK 390 DATA 249,160,102,145,203,200,192
LW 400 DATA 199,208,249,162,16,169,12
DA 410 DATA 157,66,3,32,86,228,162
OP 420 DATA 16,169,3,157,66,3,104
PG 430 DATA 104,157,69,3,104,157,68
GL 440 DATA 3,169,4,157,74,3,32
AK 450 DATA 86,228,162,6,32,0,6
XZ 460 DATA 202,16,250,32,0,6,141
SV 470 DATA 151,6,162,4,32,0,6
TQ 480 DATA 202,16,250,162,0,32,0
ND 490 DATA 6,157,196,2,232,224,5
BZ 500 DATA 208,245,162,8,32,0,6
AA 510 DATA 202,16,250,165,88,133,203
OK 520 DATA 165,89,133,204,169,0,133
HU 530 DATA 207,133,208,173,83,3,201
UU 540 DATA 1,240,1,96,32,0,6
ZS 550 DATA 201,0,240,18,201,129,48
XA 560 DATA 42,41,127,170,32,0,6
YK 570 DATA 32,31,6,202,208,247,240
GX 580 DATA 223,32,0,6,133,206,230
BF 590 DATA 206,32,0,6,133,205,32
ES 600 DATA 0,6,32,31,6,198,205
XS 610 DATA 208,249,198,206,240,197,208
TT 620 DATA 243,170,32,0,6,32,31
KV 630 DATA 6,202,208,250,240,183
XW 640 REM DEMONSTRATION PROGRAM
HT 650 DIM FN$(15)
MO 660 ? "KATARI ARTIST Picture Loader"
EK 670 ? "(Version II Machine Code)"
YG 680 ? "By Paul Lay 24/7/85":?
VK 690 ? "Enter [DEV]:<FILENAME> from"
JX 700 ? "which to load compacted picture
"
SI 710 ? "Eg. D:DOGGY.PIC"
NE 720 INPUT FN$
DG 730 I=USR(ADR(CODE$),ADR(FN$))
WV 740 POKE 764,255
KS 760 IF PEEK(764)=255 THEN 760
XB 770 POKE 764,255
QO 780 GOTO 660
```

```
1000 ; ATARI ARTIST PICTURE LOADER
1010 ;     By Paul Lay 24/7/85
1020 ;
1030 ; Nonrelocatable subroutines
1040 ;
1050  *=$0600
1060 ;
1070 GETACC
1080 ;
1090 ; This subroutine returns one
1100 ; byte from the opened picture
1110 ; file in the accumulator
1120 ;
1130  STX XSAVE
1140  STY YSAVE
1150  LDX #$10
1160  LDA #$07
1170  STA $0342,X
1180  LDA #$00
1190  STA $0348,X
1200  STA $0349,X
1210  JSR $E456
1220  LDY YSAVE
1230  LDX XSAVE
1240  RTS
1250 ;
1260 STOREACC
1270 ;
1280 ; This subroutine stores the
1290 ; contents of the accumulator
1300 ; in the current screen position
1310 ; then advances this position
1320 ; depending on the mode being
1330 ; used
1340 ;
1350  STA ASAVE
1360  STX XSAVE
1370  STY YSAVE
1380  LDY #$00
1390  STA ($CB),Y
1400  LDX MODE
1410  DEX
1420  BNE MODE2
1430 MODE1
1440  INC YPOS
1450  INC YPOS
1460  BNE SKIP1
1470 MODE2
1480  INC XPOS
1490 SKIP1
1500  LDA YPOS
1510  CMP #$C0
1520  BNE SKIP2
1530  LDA #$01
1540  STA YPOS
1550 SKIP2
1560  CMP #$C1
1570  BNE SKIP3
1580  LDA #$00
1590  STA YPOS
1600  INC XPOS
1610 SKIP3
1620  LDA XPOS
1630  CMP #$28
1640  BNE SKIP4
1650  LDA #$00
1660  STA XPOS
1670  INC YPOS
1680 SKIP4
1690  LDA $58
1700  STA $CB
1710  LDA $59
1720  STA $CC
1730  LDX #$27
1740 LOOP1
1750  LDA $CD
```

continued overleaf

PICLOADA

PICLOADA Assembly Listing continued

```
1760  CLC
1770  ADC YPOS
1780  STA $CB
1790  LDA $CC
1800  ADC #$00
1810  STA $CC
1820  DEX
1830  BPL LOOP1
1840  LDA $CB
1850  CLC
1860  ADC XPOS
1870  STA $CB
1880  LDA $CC
1890  ADC #$00
1900  STA $CC
1910  LDY YSAVE
1920  LDX XSAVE
1930  LDA ASAVE
1940  RTS
1950 ;
1960 ; Some equates
1970 ;
1980 MODE .BYTE 0
1990 ASAVE .BYTE 0
2000 XSAVE .BYTE 0
2010 YSAVE .BYTE 0
2020 XPOS = $CF
2030 YPOS = $D0
2040 SCREEN .BYTE "S:",$9B
2050 ;
2060 ; Relocatable main program
2070 ;
2080  *=$3000
2090 ;
2100 ; This program can reside
2110 ; anywhere in RAM and should
2120 ; be called from BASIC by the
2130 ; command :
2140 ; (VAR)=USR(addr,ADR(filename))
2150 ;
2160 ; Set up ANTIC #E display
2170 ;
2180  LDX #$60
2190  LDA #$0C
2200  STA $0342,X
2210  JSR $E456
2220  LDX #$60
2230  LDA #$03
2240  STA $0342,X
2250  LDA #SCREEN&$00FF
2260  STA $0344,X
2270  LDA #SCREEN/$0100
2280  STA $0345,X
2290  LDA #$0C
2300  STA $034A,X
2310  LDA #$00
2320  STA $034B,X
2330  JSR $E456
2340  LDA $0230
2350  STA $CB
2360  LDA $0231
2370  STA $CC
2380  LDA #$4E
2390  LDY #$03
2400  STA ($CB),Y
2410  LDY #$63
2420  STA ($CB),Y
2430  LDA #$0E
2440  LDY #$06
2450 LOOP2
2460  STA ($CB),Y
2470  INY
2480  CPY #$63
2490  BNE LOOP2
2500  LDY #$66
2510 LOOP3
2520  STA ($CB),Y
2530  INY
2540  CPY #$C7
2550  BNE LOOP3
2560 ;
2570 ; Now open picture file
2580 ;
2590  LDX #$10
2600  LDA #$0C
2610  STA $0342,X
2620  JSR $E456
2630  LDX #$10
2640  LDA #$03
2650  STA $0342,X
2660  PLA
2670  PLA
2680  STA $0345,X
2690  PLA
2700  STA $0344,X
2710  LDA #$04
2720  STA $034A,X
2730  JSR $E456
2740 ;
2750 ; Set colour registers
2760 ; and display flag
2770 ;
2780  LDX #$06
2790 LOOP4
2800  JSR GETACC
2810  DEX
2820  BPL LOOP4
2830  JSR GETACC
2840  STA MODE
2850  LDX #$04
2860 LOOP5
2870  JSR GETACC
2880  DEX
2890  BPL LOOP5
2900  LDX #$00
2910 LOOP6
2920  JSR GETACC
2930  STA $02C4,X
2940  INX
2950  CPX #$05
2960  BNE LOOP6
2970  LDX #$08
2980 LOOP7
2990  JSR GETACC
3000  DEX
3010  BPL LOOP7
3020 ;
3030 ; Now load in the
3040 ; picture
3050  LDA $58
3060  STA $CB
3070  LDA $59
3080  STA $CC
3090  LDA #$00
3100  STA XPOS
3110  STA YPOS
3120 MAINLOOP
3130  LDA $0353
3140  CMP #$01
3150  BEQ CONT
3160  RTS
3170 CONT
3180  JSR GETACC
3190  CMP #$00
3200  BEQ ZEROACC
3210  CMP #$81
3220  BMI LESSACC
3230 ;
3240 ; Byte > $80
3250 ;
3260  AND #$7F
3270  TAX
3280 LOOP8
3290  JSR GETACC
3300  JSR STOREACC
3310  DEX
3320  BNE LOOP8
3330  BEQ MAINLOOP
3340 ;
3350 ; Byte = 0
3360 ;
3370 ZEROACC
3380 ;
3390  JSR GETACC
3400  STA $CE
3410  INC $CE
3420  JSR GETACC
3430  STA $CD
3440  JSR GETACC
3450 LOOP9
3460  JSR STOREACC
3470  DEC $CD
3480  BNE LOOP9
3490  DEC $CE
3500  BEQ MAINLOOP
3510  BNE LOOP9
3520 ;
3530 ; Byte <= $80
3540 ;
3550 LESSACC
3560 ;
3570  TAX
3580  JSR GETACC
3590 LOOP10
3600  JSR STOREACC
3610  DEX
3620  BNE LOOP10
3630  BEQ MAINLOOP
```

Touch Tablet Utilities

2. COLOUR AT

by Paul Lay

NOTE: *This program uses the routine from PICLOADA (in this issue). PICLOADA must therefore be merged with this listing by LISTing lines 10 to 630 of PICLOADA to disk with LIST "D:<filename>",10,630 and then, after having LOADed Attributes, using ENTER "D:<filename>".*

This program takes Atari Artist pictures and allows each colour register to be changed (or attributed) on every scan line thus producing a picture with many more colours than normally available. The program is controlled with the Touch Tablet.

When the program is RUN, you will be given a list of available commands and prompted for a picture filename. Enter the filename and the picture will be loaded. By using the Touch Tablet in port #0 you can now control a cross-hair cursor which you may move about the screen. Move the cursor so that it is on a certain colour and hold down any Touch Tablet button. By moving the stylus around this colour is varied from the position of the cursor to the bottom of the screen. When the desired colour is displayed, release the button and the colour will remain set.

Note, as the colour is changed from the cursor position downwards, a top-down approach should be taken when colouring pictures.

There are five functions which are accessed by the keypresses indicated.

- [L] ... Load attributes
- [S] ... Save attributes
- [R] ... Random fill
- [B] ... rainBow fill
- [N] ... New picture

Load and **S**ave store and recall the attributes to disk with the picture filename plus the extender .ATB.

The two fill commands affect the next colour selected by replacing it with either a random or rainbow pattern. **N**ew restarts the program so that a new picture can be worked on (don't forget to save any previous work first).

Finally note that the cross-hair cursor is a player graphic controlled by strings and it is important that the strings are DIMensioned in the correct order. If you have any problems LIST the program out to disk, re-boot and ENTER it to clear the variable table.

TTRIBUTES

```
CS 1 REM ##############################################
TS 2 REM #            ATARI ARTIST                   #
HO 3 REM #         COLOUR ATTRIBUTES                 #
WE 4 REM #            by Paul Lay                    #
GI 5 REM #        COPYRIGHT (c) 1985                 #
SH 6 REM # -------------------------------------    #
XE 7 REM #   PAGE 6 MAGAZINE - ENGLAND               #
CZ 8 REM ##############################################
LQ 9 DIM P0$(256),CUR$(15),FN$(14),COL$(7
   76)
VQ 10 REM Lines 10 to 630 from PICLOADA
PO 640 REM colour attributes program
YU 650 FOR I=1694 TO 1764:READ J
LB 660 POKE I,J:NEXT I
QQ 670 DATA 72,138,72,152,72,162,0
BQ 680 DATA 141,10,212,141,10,212,141
MG 690 DATA 10,212,141,10,212,141,10
YY 700 DATA 212,141,10,212,141,10,212
DS 710 DATA 141,10,212,189,255,255,168
DS 720 DATA 189,255,255,141,10,212,140
LU 730 DATA 26,208,141,22,208,189,255
YP 740 DATA 255,168,189,255,255,140,23
OU 750 DATA 208,141,24,208,232,224,192
WQ 760 DATA 208,222,104,168,104,170,104
LJ 770 DATA 64
TC 780 GRAPHICS 0
YF 790 POKE 709,0:POKE 710,218
OF 800 POKE 16,64:POKE 53774,64
KC 810 POKE 53248,0:POSITION 4,1
YS 820 ? " Atari Artist Colour Attributes
   █"
JS 830 POSITION 4,2
JP 840 ? " By Paul Lay Copyright (C) 1985
   █"
SD 850 ? :? "  Commands Available :-"
NZ 860 ? :? "   [L] ... Load Attributes"
FD 870 ? :? "   [S] ... Save Attributes"
ZB 880 ? :? "   [R] ... Random Fill"
PR 890 ? :? "   [B] ... RainBow Fill"
MY 900 ? :? "   [N] ... New Picture"
US 910 ? :? "  Please enter [DEV]:<FILENA
   ME>"
IQ 920 ? "  for the picture that you wish
   "
DX 930 ? "  to work on, eg. D:SKETCH.PIC"
QK 940 ? :? "  ";
UZ 950 TRAP 780:INPUT FN$
WB 960 IF  NOT (FN$="C:" OR FN$(1,1)="D")
   THEN 780
CG 970 OPEN #1,4,0,FN$:CLOSE #1
DS 980 I=USR(ADR(CODE$),ADR(FN$))
FO 990 CLOSE #1:POKE 16,64
EA 1000 POKE 53774,64:COL$=""
RR 1010 FOR CR=0 TO 3
PD 1020 C=PEEK(708+(CR=3)+CR)
YN 1030 L=LEN(COL$)
RV 1040 COL$(L+1)=CHR$(C)
NQ 1050 COL$(L+194)=CHR$(C)
LE 1060 COL$(L+2,L+194)=COL$(L+1)
OS 1070 NEXT CR
SM 1080 FOR CR=0 TO 3
PI 1090 A=ADR(COL$)+194*CR
OG 1100 HI=INT(A/256):LO=A-256*HI
CZ 1110 POKE 1730+12*(CR=1)+16*(CR=2)-4*(
   CR=3),LO
MC 1120 POKE 1731+12*(CR=1)+16*(CR=2)-4*(
   CR=3),HI
OI 1130 NEXT CR
UN 1140 DL=PEEK(560)+256*PEEK(561)
VL 1150 POKE DL+1,240
PF 1160 POKE 512,158:POKE 513,6
CK 1170 POKE 54286,192
ZW 1180 PM=PEEK(106)-40
BQ 1190 POKE 54279,PM:POKE 559,62
MP 1200 POKE 53277,3:POKE 623,1
WC 1210 VT=PEEK(134)+256*PEEK(135)
LZ 1220 AT=PEEK(140)+256*PEEK(141)
NO 1230 OF=256*PM+1024-AT
KC 1240 HI=INT(OF/256):LO=OF-256*HI
CM 1250 POKE VT+2,LO:POKE VT+3,HI
GT 1260 RESTORE 1280:FOR I=1 TO 15
YR 1270 READ J:CUR$(I)=CHR$(J):NEXT I
MX 1280 DATA 16,16,16,16,16,16,16
AY 1290 DATA 238,16,16,16,16,16,16,16
KB 1300 RAND=0:BOW=0
WE 1310 P0$(1)=CHR$(0):P0$(256)=CHR$(0)
YU 1320 P0$(2)=P0$
TU 1330 IF PEEK(764)<>255 THEN 1540
MN 1340 X=PADDLE(0)+10:Y=238-PADDLE(1)
IB 1350 IF X=238 AND Y=10 THEN 1330
PP 1360 IF X<45 THEN X=45
BC 1370 IF X>204 THEN X=204
PT 1380 IF Y<26 THEN Y=26
IB 1390 IF Y>217 THEN Y=217
SM 1400 POKE 53248,X:P0$(Y)=CUR$:POKE 704
   ,14*( NOT PEEK(704))
HL 1410 IF STICK(0)=15 THEN 1310
BY 1420 POKE 53248,0
TQ 1430 SX=2*(X-45):SY=Y-26
SI 1440 LOCATE SX,SY,A:LOCATE SX+1,SY,B
BM 1450 CR=2*A+B-1+4*( NOT (A+B))
BE 1460 IF RAND THEN FOR I=194*CR+Y-25 TO
    194*CR+194:COL$(I)=CHR$(PEEK(53770)):
   NEXT I:RAND=0:GOTO 1310
RC 1470 IF BOW THEN FOR I=194*CR+Y-25 TO
    194*CR+194:COL$(I)=CHR$(2*I):NEXT I:BO
   W=0:GOTO 1310
IG 1480 IF STICK(0)=15 THEN 1310
KQ 1490 COL=16*INT(PADDLE(0)/15)+INT(PADD
   LE(1)/15)
UV 1500 COL$(194*CR+Y-25)=CHR$(COL)
NH 1510 COL$(194*CR+194)=CHR$(COL)
JL 1520 COL$(194*CR+Y-24,194*CR+194)=COL$
   (194*CR+Y-25)
TD 1530 GOTO 1480
ML 1540 K=PEEK(764):POKE 764,255
BA 1550 IF K=0 THEN 1610
WN 1560 IF K=62 THEN 1700
PY 1570 IF K=40 THEN RAND=1:BOW=0
OJ 1580 IF K=21 THEN BOW=1:RAND=0
NN 1590 IF K=35 THEN 780
OX 1600 GOTO 1310
MI 1610 POKE 54286,64:GOSUB 1790
ZL 1620 TRAP 1680:OPEN #1,4,128,FN$
QY 1630 POKE 850,7:AD=ADR(COL$)
NM 1640 HI=INT(AD/256):LO=AD-256*HI
OL 1650 POKE 852,LO:POKE 853,HI
QT 1660 POKE 856,8:POKE 857,3
CH 1670 I=USR(ADR("h█+ V█◆"))
VD 1680 TRAP 1690:CLOSE #1
MC 1690 POKE 54286,192:GOTO 1310
MH 1700 POKE 54286,64:GOSUB 1790
DB 1710 TRAP 1770:OPEN #1,8,128,FN$
WP 1720 POKE 850,11:AD=ADR(COL$)
NL 1730 HI=INT(AD/256):LO=AD-256*HI
OK 1740 POKE 852,LO:POKE 853,HI
QS 1750 POKE 856,8:POKE 857,3
CG 1760 I=USR(ADR("h█+ V█◆"))
VB 1770 TRAP 1780:CLOSE #1
MB 1780 POKE 54286,192:GOTO 1310
KQ 1790 DP=0:FOR I=1 TO LEN(FN$)
UZ 1800 IF FN$(I,I)="." AND  NOT DP THEN
   DP=I
FI 1810 NEXT I
IB 1820 IF  NOT DP THEN DP=LEN(FN$)
NW 1830 IF DP>12 THEN DP=12
RO 1840 FN$(DP)=".ATB"
BE 1850 RETURN
```

□

GRAPHICS ART DEPARTMENT

Databyte

reviewed by Alan Goldsbro

Every now and then among the multitude of good quality entertainment, comes a package worthy of the accolade 'supreme'. The Graphics Arts Department from Databyte has all the hallmarks of such a program.

This is the latest in a line of graphics software from various companies and is compatible with all computers with a minimum of 48k. It comes on disk only and is joystick controlled.

To my way of thinking the program has four parts

1. Arts Bench
2. Editor
3. Picture Viewer
4. Picture Dump

ARTS BENCH: Menu driven, over 30 commands selected by keyboard including any of 128 colours, all selected from four paint pots and a mixing palette. To achieve more than 4 solid colours at any one time you have to employ the use of the DLI command. This proved to be difficult at first as the documentation is rather sparse here. Basically, if you select a colour register of your choice for the DLI's then plot where you want your band of colour to start, you may then plot colour changes all the way down the screen using the same register with either a different shade of the original colour or a new colour chosen from the sixteen solid colours available on the Atari. Whenever you use the original colour register in the area you have designated for your variations you will achieve your desired result. You can use any of the three other registers to draw with over your DLI's without the colour being changed. (I told you it was difficult, but it is well worth it!). DLI's should not be turned off without first saving your picture as, once turned off, you'll have to reset them again. This caused me considerable time on developing a picture. Full use of the Rainbow command is available on any of the colour registers but not when you have elected for DLI's.

There are 16 set patterns which can be used as backgrounds or for in-fill, which which can also be modified to suit your own ideas but we'll come back to this later. The usual commands such as Lines, Rays, Circles, Rectangles are available plus Triangles and Ellipse. I especially enjoyed the Ellipse as you get the opportunity to select the degree of angle. There is a Kaleidoscope mode which lets you draw symmetrically in four locations at the same time.

An unusual command is a Cursor location command. Press '?' at any time and it will tell you the co-ordinate of the cursor. A three stage zoom is standard, Brush speeds can be altered and there is a comprehensive list of 40 different brush sizes plus a built in editor.

We now come on to the more advanced parts of the menu. Invert (swap colour) allows you to either invert the screen, or an area, or to select the colours you wish to invert. Rotate is an excellent command. Define the area, move the joystick to rotate and press the trigger to set it. The Move Block is another good command allowing Move Full Block or Foreground and it even has a Move Again facility. Another command in a similar vein is Mirror/Flip. Again you define the area, press the trigger and there you have it either mirrored horizontally or flipped vertically. Undo Last Command is a godsend in any drawing program, if you make a mistake and spoil you work just press 'U' to restore your picture to its original condition. For those amongst you who love to play about, Scroll Picture will occupy you for hours, use the cursor keys to move the picture left, right, up or down.

To finish off your masterpiece all you need is to give it a nice caption and G.A.D. allows you to do just that! Type in your message, choose from nine different sizes, move it to anywhere on the screen and press the trigger. A nice facility is Last Message where you can achieve a 3-D effect by changing the colour of the text and overlaying the original with the new. There is also an in-built font editor.

The Disk Utilities have a very good range - Load/Save picture, Format Disk, Directory of Disk, Delete Files and Rename Files. The Directory displays not only the Pictures but also Fonts, Patterns and Brush files and free sectors. All Load and Save routines have masking and previous file recognition.

THE EDITORS: There are three editors available, Font, Pattern and Brush. All the editors employ the same theme, you modify an existing set. Designs can be Saved or Loaded at any time. Even though there are already 40 brushes, the use of an editor is worthwhile especially if you wish to 'spot' colours on the screen. The same applies to the Patterns. Apart from getting a 8 x 8 editor, there is also a display across the width of the screen. Colours can be changed but need to be selected before editing for best results. With the Font editor I found that if you use a font from the many types available on one of the PAGE 6 Utility disks and rename them using .SET as the extender, then you will save yourself a whole lot of time. On the other hand, playing with the editor can be a whole lot of fun.

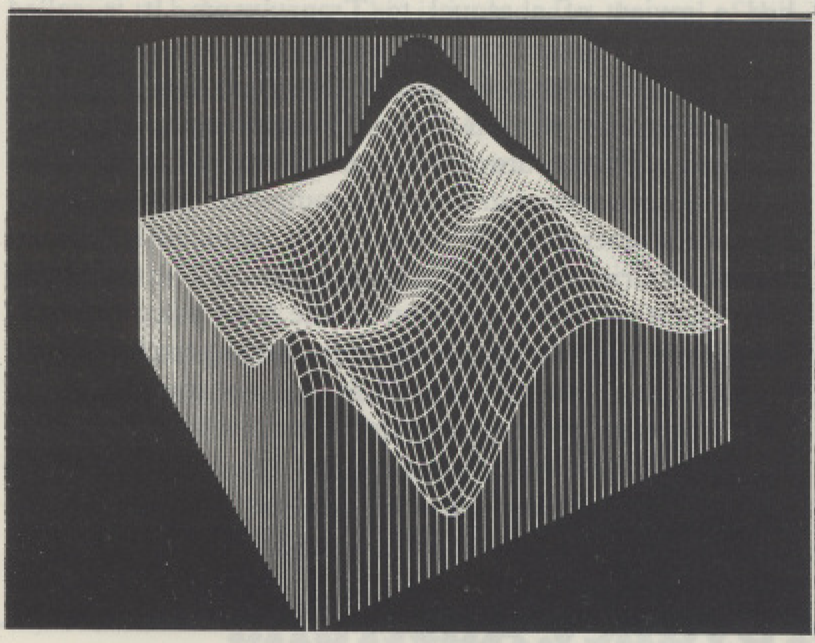
PICTURE VIEWER: Apart from loading pictures singly from the Arts Bench, the only way to view pictures properly is to load up the section titled Arts Gallery which is a self-contained program which can be copied to other disks. The annoying part is that you cannot go from this to the Arts Bench or vice versa, each part has to be loaded separately. However, as previously stated , you can Format, write DOS

and Autoboot and write this program to disk, all without ever leaving the program. Choosing pictures is simple but unfortunately it does not have the capabilities to memorise a selection of pictures thus causing you to forever return to the menu to choose the next one.

PICTURE DUMP: This section is again selected from the 'Art Gallery'. A choice of three printers is given (Epson, Gemini and Prowriter) plus the opportunity to create your own by typing in your printer codes. Once a printer option is displayed on screen with the option to accept or refuse it, you are offered the choice of using twelve different variations of shading. These are quite well represented by a number of dots per area from 24 (solid) to 0 (blank). Each colour can be selected for shading of your choice. The program cannot detect subtle changes in colour variations such as using DLI's to achieve more than four colours, consequently only four shades are dumped to the printer. The picture itself is one size, taking half a page. The timing for the dump was average and the quality good.

CONCLUSION: With extensive error trapping, clear messages and the added bonus of a machine code program to allow insertion of pictures into BASIC files, the program is excellent value for money. All programs, except those stated, are heavily protected against copying. The only minus points are the documentation which is only ten pages long, with six devoted to instructions and only one demo picture. For a wide ranging and comprehensive program such as this, much more extensive documentation should have been provided.

Graphics Art Department is priced at £29.90 and is available from any of the retailers advertising in PAGE 6 or from the distributors themselves. Whether you are a budding artist or just a doodler, the Graphics Art Department is for you!



II. TRANSYLVANIA



I was lying in the sun wondering what to write about for this month's Adventure column when the temperature suddenly dropped and the sky clouded over. "Oh, oh. Looks like we're in for a storm," I said to myself.

As I moved inside and settled down at my desk, a nerve shattering crack of thunder broke the summer silence. Then down came the rain. And the hail.

As it happened, it was only one of our typical summer thunderstorms and the frenzy was short lived. However, while the sky was dark and the rain pelted down, it reminded me of the inevitable thunderstorm in all those B-grade horror movies. Do you know the ones I mean? They're always set in an eerie old mansion or a castle with a cemetery and the story involves vampires or werewolves. Aha! That's just what the Adventure column needs for a change. A good, old fashioned horror story. And Penguin Software's "Transylvania" fits the bill perfectly.

THE GAME: "Velcome to TRANSYLVANIA! Von't you please sign the guest register?..." That sounds like a reasonable request. You sign your name.

"And your next of kin?" Oh, oh! You don't like the sound of this, but you type in your next of kin's name nevertheless.

"Far away a clock strikes 12..."

You have just begun playing Transylvania. The object of the game is to find and rescue the Princess Sabrina before dawn. If you're an old, die-hard Adventurer, then you've probably rescued more Princesses than most people have had hot dinners. One more should be a piece of cake, so you set off full of confidence.

Almost immediately, you're being taunted by strange sounds in the forest. "You hear moaning noises in the distance...A witch's cackle cuts through the still air of the night...A strange ghostly shape floats past mournfully crying 'GARRY, GARRY'..." Sooner or later (and more likely sooner than later), you'll encounter the werewolf. If you hang around longer than one move, he'll have you for dinner, so you'd better move off as soon as he appears. Unfortunately, he keeps popping up all over the place and you'll soon grow to dread his untimely appearances. Therefore, your first aim should be to kill the werewolf. This won't be too difficult if you remember your horror movies and you can find the relevant items to carry out the task.

Once free of the werewolf, you can explore the enchanted forest and its surrounds at your leisure. When you venture into the castle, you'll encounter another of Transylvania's distasteful inhabitants - the vampire. Unlike the werewolf, the vampire can easily be kept at bay (if you remember your horror movies), but is that the right thing to do? I'll let you ponder on that.

And so it goes on. If you like all those awful B-grade horror movies of the 1950's and 1960's, then you'll love Transylvania.

OTHERS IN THE SERIES: Actually, Transylvania is only one of a series of Adventures available from Penguin Software. The others are The Coveted Mirror, The Quest and Ring Quest. All are illustrated Adventures in much the same vein as others that I've reviewed in this column. At the time of writing, only Transylvania and The Quest are available for the Atari. However, this may change in the future.

I recently discovered an excellent little Adventurers' newsletter called "Questbusters". The November 1985 issue had a review of a sequel to Transylvania. It is called "Crimson Crown: Transylvania II" and has more illustrations and harder puzzles than the original. It is also the first Adventure written with "Comprehend", Penguin's proprietary Adventure development system. Comprehend allows easier conversion to various computers and also has an advanced parser for full sentence input. Apparently an Atari version of Crimson Crown is underway and The Quest and Ring Quest are being rewritten for the Atari using Comprehend. I can hardly wait! (Incidentally, for anyone interested, Questbusters is a very authoritative 12 page monthly newsletter covering news, reviews and classified advertisements for die-hard Adventurers and fantasy role playing gamers. International subscriptions are US$22 per year from Questbusters, 202 Elgin Court, Wayne, PA 19087, U.S.A.)

by Garry Francis of Sydney, Australia



A GRIPE: Unfortunately, I do have one gripe about Transylvania. When I tried to boot the disk, it just refused to load. I disassembled the boot sectors and found that this failure to load was probably because of an oversight in a timing routine in the copy protection. Without digging too deeply, it appeared that the program would have worked alright on an NTSC system which updates the real time clock 60 times per second, but it would not work on a PAL system which updates the clock 50 times per second. I have since bought The Quest and found that it had the same problem. In both cases, I overcame the problem by changing one byte to bypass the timing routine.

I have notified Penguin of the problem and, quite to my surprise, they quickly responded that the technical department had been informed and would work on a solution to the problem. In the meantime, if you buy Transylvania or The Quest and you encounter the same problem as I did, just change sector $05 byte $41 from $A9 to $60 (assuming the bytes within a sector are numbered from zero and all values are hexadecimal). Alternatively, just run the accompanying BASIC program and you can kiss your loading problems goodbye.

HINTS: Transylvania has fairly logical puzzles and I found it fairly easy to solve. If you have any problems, I can think of four sources for you to turn to. Firstly, you can refer to my usual hints at the end of this column. These are coded in the same way as usual and should help you out with most problems without giving you a straight out answer.

Secondly, you can write to Penguin Software at the address given in the documentation and ask for the Transylvania hint sheet. This is very thorough. You first look up a keyword (like werewolf) which gives you one or two numbers. You then look up the question corresponding to the number. There are 32 questions altogether. Each question has three hints ranging from vague to very specific. Both questions and answers are coded to avoid revealing too much. For example, question 1 reads "VCK RC W YWZZ HVS KSFSKCZT?" which must be decoded using a slip code to reveal "HOW DO I KILL THE WEREWOLF?". As I didn't receive my hints until after I'd finished the game, I didn't want to manually decode all 32 questions and 96 hints, so I wrote a little program to help me out. This is included at the end of this article. You can also use it with the hints for The Quest.

Finally, you can get a complete solution in "A Shortcut Through Adventureland" by Jack Cassidy, et al (Datamost) or "The Book of Adventure Games" by Kim Schuette (Arrays, Inc.).

HELP WANTED

Just before finishing up this month, I've got a couple of requests of my own. One Adventure that I'd love to cover in the near future is Asylum. (Great game!) Unfortunately, I haven't been able to solve it. If anyone knows how or where to get the magnet or the platinum card, please let me know! First in with the correct answer gets a free disk of Adventures!

```
CS 1 REM ############################################
LF 2 REM #   BOOT PROBLEM FIXER-UPPER  #
MF 3 REM #             for             #
EL 4 REM # TRANSYLVANIA AND THE QUEST  #
SC 5 REM #       by Garry Francis      #
SH 6 REM # --------------------------- #
XE 7 REM #  PAGE 6 MAGAZINE - ENGLAND  #
CZ 8 REM ############################################
KM 100 POKE 82,1:POKE 83,39:GRAPHICS 0:PO
   KE 710,18:POKE 752,1
WL 110 DIM ML$(4),BUFFER$(128):FOR I=1 TO
    4:READ A:ML$(I)=CHR$(A):NEXT I:DATA 1
   04,76,83,228
DL 120 POSITION 7,1:? "INSTRUCTIONS FOR M
   ODIFYING":POSITION 7,2:? "TRANSYLVANIA
    AND THE QUEST"
AC 130 ? :? "1. Ensure that the disk's wr
   ite protect   notch is uncovered.":? :
   ? "2. Insert disk into drive 1."
CR 140 ? :? "3. Press RETURN to modify di
   sk or ESC      to abort.":POKE 82,2:? :
   ?
WR 150 POKE 764,255
DU 160 A=PEEK(764):IF A=255 THEN 160
MP 170 IF A=28 THEN POKE 82,2:GRAPHICS 0:
   END
DQ 180 IF A<>12 THEN 150
FN 190 BUFFER$(128)=" ":A=ADR(BUFFER$):HI
   =INT(A/256):LO=A-256*HI
AS 200 POKE 769,1:POKE 770,82:POKE 772,LO
   :POKE 773,HI:POKE 778,5:POKE 779,0:GOS
   UB 230
OP 210 IF BUFFER$(66,66)<>CHR$(169) THEN
   ? "YOUR DISK IS DIFFERENT TO MINE":? "
   OPERATION ABORTED":GOTO 250
PU 220 BUFFER$(66,66)=CHR$(96):POKE 770,8
   7:GOSUB 230:? "OPERATION COMPLETE":GOT
   O 250
GL 230 A=USR(ADR(ML$)):IF PEEK(771)=1 THE
   N RETURN
LG 240 POP :? "ERROR ";PEEK(771);"...OPER
   ATION ABORTED"
DT 250 POKE 752,0:POKE 764,255:END
```

Some years ago, SoftSide magazine had a thing going called the "Adventure of the Month Club" where you paid a six monthly subscription and they sent you an Adventure every month. I was in the club for about 18 months, but I missed out on the very early Adventures and one of the last ones. When I tried to buy these from SoftSide, they told me that they weren't available for the Atari. However, thanks to a Page 6 reader, I have now discovered that they were lying to me! As SoftSide is now kaput, I must turn to Page 6's readers for help. Does anyone have the old SoftSide Adventures? I'm looking for Jack the Ripper, Crime, Around the World in Eighty Days and Jack the Ripper II (if it was ever released). I can swap for others in the series or buy them outright. Any offers?

NEXT ISSUE: That's all for this issue. Next time around we'll probably do a little hitchhiking. If you've got any comments on the column or requests for future topics, just drop me a line at the address below.

Garry Francis
c/o Atari Computer Enthusiasts (N.S.W.)
Adventure S.I.G.
G.P.O. Box 4514,
Sydney,
N.S.W. Australia 2206

Hints overleaf

TRANSYLVANIA HINTS

```
CS 1 REM ########################################
DJ 2 REM #       HINT DECODER FOR              #
EK 3 REM # TRANSYLVANIA AND THE QUEST          #
SB 4 REM #       by Garry Francis              #
XC 5 REM #  PAGE 6 MAGAZINE - ENGLAND          #
CX 6 REM ########################################
GQ 10 GRAPHICS 0:DIM A$(100)
XB 20 TRAP 20:? :? :? "ENTER CLUE";:INPUT
   A$
MF 30 FOR I=1 TO LEN(A$):X=ASC(A$(I,I)):I
   F X>64 AND X<79 THEN X=X+12:GOTO 50
TD 40 IF X>78 AND X<91 THEN X=X-14
QS 50 ? CHR$(X);:NEXT I:GOTO 20
```

1. Can't read the writing on the stump?
67 21 38

2. Can't get past the rock slide?
5 74 93

3. Can't kill the werewolf?
25 82 87 84 86 56

4. Still can't kill the werewolf?
25 82 87 8 57 56

5. Still can't kill the werewolf?
96 21 80 49 21 70

6. Does the eagle keep taking you to another part of the forest?
95 74 18 82 69 51 24 5

7. Can't get past the cat?
96 21 80 49 21 70

8. Don't know what the broom is used for?
39

9. Don't know what the bread is used for?
17 64 6 56

10. Can't climb the ladder?
82 28 48 12 35

11. Can't get the ring?
78 94 21 41 56

12. Can't find the vampire?
19 21 42

13. Still can't find the vampire?
19 22 3

14. Can't kill the vampire?
19 21 1 85

15. Can't find the wooden stake?
95 74 89 1 85 15 19 21 58 65

16. Can't find the holy water?
95 74 89 58 65 15

17. Still can't kill the vampire?
28 82 16 44 56 47 21 7 10 44 82 28

18. Can't open the sarcophagus?
19 14 75

19. Can't catch the flies?
20 74 84 72 30 15

20. Can't open the door in the cave?
95 74 89 36 15

21. Still can't open the door in the cave?
23 21 46 52

22. Can't get out of the cave?
82 73 9 24 5

23. Can't find the wizard's cloak?
29 21 83 90 9 21 32



24. Still can't find the wizard's cloak?
95 28 43 60 49 91 59

25. Still can't find the wizard's cloak?
92 37 53

26. Can't find the elixir?
21 45 55 21 36

27. Can't get the key from the goblin?
26 74 21 13 66 24 56

28. Haven't found where to use the key?
19 21 54

29. Still haven't found where to use the key?
4 63 40 88

30. Can't help the statue?
50 21 11 27

31. Alien got you baffled?
81 62 82 2 84 76 79

32. Can't open the sarcophagus?
25 82 31 84 34 61 33 21 77 68 56

33. Can't break the spell on Sabrina?
50 21 71

1 WOODEN	15 !	29 RIDE	43 TWO	57 AMMUNITION	71 BOOK
2 SEE	16 GETTING	30 ONE	44 CROSS	58 HOLY	72 STICKY
3 SOMETHING	17 RED	31 HAD	45 GOBLIN	59 CABIN	73 WOULDN'T
4 PUSH	18 NOTHING	32 SIGN	46 WIZARD'S	60 ROOMS	74 IS
5 IT	19 TRY	33 OF	47 SHOW	61 ENCOUNTER	75 LATER
6 SANDWICHES	20 THAT	34 CLOSE	48 OBVIOUSLY	62 AFTER	76 SHOOTING
7 VAMPIRE	21 THE	35 ALONE	49 IN	63 YOUR	77 THIRD
8 SOME	22 DROPPING	36 KEY	50 REMEMBER	64 HERRING	78 WHO
9 READ	23 SEARCH	37 HELPS	51 DO	65 WATER	79 STAR
10 HOW	24 ABOUT	38 SEDIMENT	52 CLOAK	66 CROAKING	80 COFFIN
11 CRYSTAL	25 HAVE	39 TRANSPORTATION	53 (ANAGRAM)	67 DISSOLVE	81 RETURN
12 NOT	26 WHAT	40 WEIGHT	54 CEMETRY	68 KIND	82 YOU
13 FROG	27 BALL	41 LADDER	55 HAS	69 CAN	83 BROOM
14 AGAIN	28 ARE	42 CASTLE	56 ?	70 WAGON	84 A

85 STAKE
86 WEAPON
87 GOT
88 AROUND
89 NO
90 AND
91 HIS
92 SATURN
93 IMPENETRABLE
94 SHOOK
95 THERE
96 OPEN

GOTO DIRECTORY

The GOTO DIRECTORY is a guide to retailers who provide product support for ATARI computers. Many of these retailers will supply Mail Order so if you have problems finding a supplier, turn to the GOTO DIRECTORY.

Retailers who are interested in an entry in this feature should contact the Editor on 0785 213928

A.S.WOOTTON & SONS,
116, Edleston Road,
Crewe,
CW2 7HD
Tel. 0270 214118

Nothing but ATARI. Authorised Service Centre with fast turnaround of all repairs. All Atari stock plus printers, joystick inserts and extension leads at good prices. Try us for repairs or purchases.

COMPUTER CENTRE,
174, High Street,
Hornchurch,
Essex
Tel. 04024 75613 or 44255

We have a large range of software, hardware, printers, interfaces, magazines and books. Full support given to interfacing, word processing etc. Computer repairs. We specialise in all home computers. Mail Order or personal callers welcome.

BITS AND PIECES,
10, North Street,
Strood,
Rochester,
Kent
Tel. 0634 716422

A NEW Atari only shop in the Medway area. XL/XE/ST always in stock. We are happy to demonstrate the latest software and offer the most friendly service. Remember we are ATARI only. We stock the best.

TELETEX (YORKSHIRE) LTD.,
28, Brooklyn Court,
Bradford Road,
Cleckheaton,
W.Yorks
BD19 4TJ
Tel. 0274 875299

Atari specialist. Atari software and hardware at keen prices. Free advisory service for Atari enthusiasts. Mail Order division. Full discounted range of software. Send s.a.e. or phone for Atari list. HQ of West Yorkshire Atari Owners Club.

LADBROKE COMPUTING,
33, Ormskirk Road,
Preston,
Lancs. PR1 2QP
Tel. 0772 21474 or 0772 27236

We offer full service and support for any Atari and have all peripherals and available software in stock. Come to the shop for personal service or try us for Mail Order. Either way you'll be pleased you did.

INTOTO,
1, Heathcoat Street,
Hockley,
Nottingham,
NG1 3AF
Tel. 0602 410987

A comprehensive range of hardware, software, peripherals, joysticks, books and magazines etc. Please call or ring for helpful, friendly support.

PEATS ELECTRONICS,
25, Parnell Street,
Dublin 1,
Ireland
Tel. (00)01 749972/3/4

We stock a full range of Hardware, Software, Interfaces, Printers and accessories. The fullest support for Atari in Ireland. Mail order throughout the U.K.

FEE'S
194, High street,
Scunthorpe,
S.Humberside
Tel. 0724 857652

Your Atari specialist in Humberside for hardware, software and publications. Open 9.30 a.m. - 5.30 p.m SIX days a week. For personal attention ask for Nick or Frances.

MICROBYTE,
71, Seaview Road,
Liscard,
Wallasey,
Merseyside, L45 4QW
Tel. 051 630 6933

Tired of high prices, poor service and hidden charges from other Mail Order retailers? Try us for the latest titles and U.S. mags. Visit or call anytime up to 6 p.m.

JENNINGS STORES,
248, Hertford Road,
(Nr. Green Street),
Enfield,
Middx
Tel. 01 804 1767

Very large range of English and American software available as well as the very latest in hardware.

SOFTWARE EXPRESS,
514-516, Alum Rock Road,
Alum Rock,
Birmingham 8
Tel. 021 328 3585

We are a company dedicated to supplying ALL your Atari needs which also includes a PERSONAL IMPORT SERVICE and an out of warranty repair service. Phone 021 328 3585

TRIONIC,
144, Station Road,
Harrow,
Middx. HA1 2RH
Tel. 01 861 0036

Software, peripherals, books and magazines. A comprehensive range for Atari. Amstrad, Comm- odore and Spectrum. Try our late night shopping. Open 10 a.m. to 8 p.m. Monday to Saturday. Give us a call or pay us a visit.

RADFORD HI-FI LTD.,
52, Gloucester Road,
Bristol,
Avon
Tel. 0272 428247

We stock and support a comprehensive range of products for Atari. Huge range of software from educational to small business (plus games of course). Word processing packages. Printers. All for the best computers. ST's available from stock.

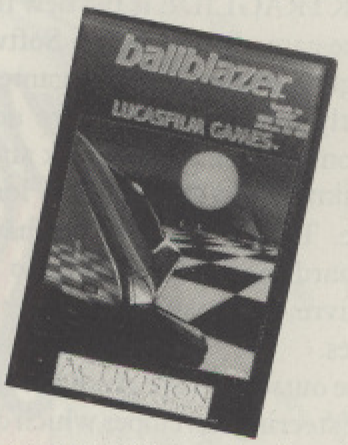
YORK COMPUTER CENTRE,
7, Stonegate Arcade,
York,
Tel. 0904 641862

Top American and English software - over 1000 titles! Hardware, books, magazines, accessories. If you need anything for your Atari, try Yorkshire's widest and most comprehensive range of products for your machine.

SHORT REVIEWS



Jim Short reviews some recent releases



BALLBLAZER

Lucasfilm/Activision
48K cassette £9.95
48K disk £14.95
1/2 players
1/2 joysticks

The year is 3097 and the name of the game is BALLBLAZER - the most popular sport in the Universe. Jump into your Rotofoil and take to the grid for the head-to-head confrontation of the century. Have you got what it takes to become a Masterblazer?

BALLBLAZER might be described as a cross between Soccer and Rollerball. It takes place on a huge chequered grid, rectangular in shape, with moving Goalbeams at either end. There are no teams - just you strapped in your high speed Rotofoil against a similarly equipped opponent.

The screen is split into two, so that both players have their own seperate view of the grid. You do not see your own Rotofoil, only your opponent's. A typical BALLBLAZER game goes something like this: You face one another down the length of the grid. Two Rotofoils. Two streamlined gladiators. Wherever you go in the Universe, there's only one regulation BALLBLAZER game - three minutes, two players, one victor. Here we go! The computer fires the Plasmorb in from the left. You know you have to get to that orb before he does. Okay, you reach the orb first. Your Rotofoil captures it in it's Pullfield - the pillow of energy surrounding it - and the orb immediately changes to your colour. Wait for the Rotosnap and then accelerate down the grid towards those Goalbeams. They're moving, of course, in the same direction the orb is fired. You sight the goal and now's your chance to surprise him. He moves in to block. Back off and shoot the orb just as the Goalbeams disappear over the horizon. That's it! A brilliant over-the-horizon (OTH) shot. Three points on the scoreboard already. You have to get those OTH shots in early before the goal starts to shrink!

You're in deep trouble from the second face-off. He fools you with some neat Pushfield dribbling and shoots a two-pointer. You get the orb next time round but he Buzzblasts it away and then captures it to shoot another two-pointer. Hey, this guy's no pushover! He leads four to three. You're playing great defence now, but missing a lot of shots on offence. You change tactics slightly. You capture the orb but you don't shoot it at goal. Instead, you fake a shot and then run it in for a solitary point to even the game-score. He tries the same thing and gets that vital one-pointer. There's only 20 seconds left and you're five to four down!

Face-off number six coming up. You capture the orb and set off down the grid. He's closing in, trying to Buzzblast the orb away. If you lose the orb now it's curtains! You back off - the only safe way to go is back. You can just see the goal on the horizon but it's too small to attempt a crazy three-pointer at this stage. Time's running out, so you've got to do something - anything. You try an angled shot off the Electroboundary. It misses, but you capture the rebound. The goal's much nearer this time. Blast! Blast! You made it - a two-pointer! There's only 3 seconds left on the clock and no way back for him now. The face-off is a mere formality. The clock hits zero and it's all over. You win six to four. The atmosphere over the asteroid glows with the purple colour of your victorious Rotofoil. You are BALLBLAZER Champion of the Universe..

BALLBLAZER can be played against a human opponent (the only true way to play the game!) or a variety of computer-controlled Droids. The game timer can be set anywhere from one to nine minutes. You score one, two or three points depending on the distance of your shot and ten points wins the game outright, otherwise the winner is the player with the most points when the timer hits zero. If the points are equal at this stage, the game goes into overtime.

And now for the superlatives, if I can find enough to go round. The graphics are mind-blowing, but then the whole package oozes class from start to finish. Disk owners are in for a special treat as the disk version of BALLBLAZER features an incredible animated loading sequence, the like of which I've never seen before. Even the theme music - or the 'Song of the Grid' to give it it's proper title - is something else! It kicks off with a deep bassy toe-tapping rhythm and synthesizer harmonies are then added to produce a complex computer masterpiece which Rick Wakeman himself would be proud of. Yes folks, BALLBLAZER truly is the ultimate in computer games. If you don't buy it, you certainly don't deserve to call yourself an Atari owner - even if you never actually play the game you will still own the most incredible sound & graphics 'demo' yet seen on an 8-bit micro!

Anyway, I'll have to go now. Another budding BALLBLAZER champion awaits my challenge. Still, that's the name of the game. The only game. BALLBLAZER - three minutes, two players, one victor!!!

→

ELEKTRAGLIDE

English Software
48K cassette £8.95
48K disk £12.95
1 player
Joystick



ELEKTRAGLIDE is the new futuristic race game from English Software. Although marketed as a race game, this is slightly misleading as there are no other competitors on the track and the aim is simply to survive for as long as possible. To do this you will have to drive hard and fast and also outmanoeuvre a variety of tricky obstacles.

At the outset you are given the choice of three steering envelopes which determine how your vehicle responds to joystick control. You can then choose from 3 different tracks in 3 world countries - UK, America or Australia - but, again, this is misleading as to my eyes all three tracks are identical apart from the odd difference in colour-shading.

Unlike the majority of race games, Pole Position included, you do not see your own vehicle as such. Your view is, in fact, a view out of the front windscreen of your vehicle with a dashboard display at the bottom of the screen to keep you informed of your speed and count-down timer, etc. You begin Stage One of the game in a tunnel and you must try to reach the next tunnel (Stage Two) before the timer on the dashboard reaches zero. You do all this whilst attempting to avoid wet patches on the road, electrostatic columns beamed down by overhead rockets and, worst of all, attacking spheres which track you diligently. At the same time, you should avoid straying onto the roadside kerbing as this reduces your speed and, in turn, costs you valuable time. Time is extremely critical in this game!

Graphics are outstanding. The track is very reminiscent of that in Pole Position but the background scenery is much more colourful and spectacular, with a huge snow-capped mountain range dominating the proceedings. The 3-D image is superb - I particularly liked the effects of driving through the tunnels - and scrolling is smooth and completely flicker-free. The theme music is excellent too and, according to the cassette inlay, is by Yekao (Yek-who?).

Now for the bad points. Firstly, there just isn't enough time to complete each stage. You have to drive flat out all the way in order to have any chance at all, making it virtually impossible to avoid the spheres - especially when you go blazing round a corner and smash straight into one before you get the chance to see it! Also, control could have been better. You have no brakes and can only slow down by decelerating, which isn't a lot of good when you need to brake in a hurry to avoid an oncoming obstacle. On top of that, you have to keep the joystick pushed forward at all times to maintain speed. This severely hampers your left/right movement and doesn't do a great deal for your outmanoeuvring ability either! Why not use the firebutton for accelerating and decelerating as this doesn't get used during the game anyway. Finally, you do not score any points nor is there any record of distance travelled, no average speed, no readout whatsoever. Where is the incentive to play the game again, I wonder?

To sum up, ELEKTRAGLIDE is a reasonable enough game which could be a truly excellent game with a few improvements here and there. At the moment it suffers from looking much better than it plays. Perhaps it's biggest fault is that it's so damn difficult with no leeway for the novice gamester like myself. If you're the type who struggles to make the grid at Pole Position then ELEKTRAGLIDE may well be beyond your capabilities.

SMASH HITS Vol. 4

English Software
48K cassette £9.95
48K disk £12.95
1 player
Joystick



As the name implies, this is the fourth in a series of compilation tapes from English Software. It contains three of their most recent releases - CHOP SUEY, HIJACK and KISSIN' KOUSINS - plus one other new one which I haven't come across before, entitled FIRE CHIEF. The first three games have already been reviewed in previous issues of Page 6, leaving only FIRE CHIEF to be covered here.

This particular game covers two completely different scenes and requires you, first of all, to drive your Fire Chief Mobile along a busy four-laned motorway - dodging traffic at high speed - to reach the offices of English Software in time to thwart the dastardly Phantom Fire Bomber, who is trying to destroy all the pre-release disk copies of Elektraglide. Here, the driving screen gives way to a maze type screen as you fight your way through the advancing flames to retrieve the disks from the safe before they melt into oblivion. From then on the game gets progressively more difficult with even more disks to save but less and less time to do it in. Meanwhile, clues can be collected along the way to help you guess the identity of the Phantom.

At the risk of offending all CHOP SUEY fanatics out there, I have to say that FIRE CHIEF is my favourite game of the four. Graphics and sounds are first-rate and, just for a change, English Software have come up with a game which even I can get to grips with!

Anyway, SMASH HITS No.4 is worth the asking price for CHOP SUEY and FIRE CHIEF alone. Great value for money.

MERCENARY

Novagen
64K cassette for XL & XE £9.95
48K cassette for 400 & 800 £9.95
48K disk (all models) £12.95
1 player
Joystick/Keyboard

You are cruising through space when your ship suddenly goes out of control and you are forced to crash-land on the nearby planet of Targ. You immediately find yourself slap-bang in the middle of a war between the normally peaceful Palyars - inhabitants of the planet - and the invading Mechanoids. Adopting a Mercenary role (more out of need than out of choice) you proceed to explore the planet, hoping to find the ways and means of escape. It will be a long and sometimes frustrating process, but it can be done. Indeed, escape can be achieved in a number of different ways, but you must box clever. You can choose to swear allegiance to either side or play them both off against each other in a bid to lay your hands on the intergalactic craft which will take you away from Targ. Your only true friend in all this is the ever-reliable BENSON - an almost human PC which you man-

aged to salvage from the crash - and he will keep you well informed of any important happenings and won't hesitate to offer advice whenever he thinks you need it!

And so the scene is set for MERCENARY - 'Escape from Targ', the second game from Paul Woakes who's previous effort was the enormously popular ENCOUNTER (in my opinion, the best ever game from a UK programmer). However, if you're expecting ENCOUNTER Mark II then think again. Using hi-res vector graphics (geometrical 3-D shapes), MERCENARY is not so much an arcade game as a unique combination of flight simulation, adventure and arcade action which Novagen describe as a 'World Simulator'.

The game is based around a player's-eye view of the proceedings with the action taking place in real time as you set about exploring the cities of Targ and their mysterious subterranean complexes, all the while becoming more deeply embroiled in the continuing conflict between the Palyars and their robot foes.

When you are tired of trekking around on foot you can hop aboard any one of a variety of high-speed craft which will make travelling a whole lot quicker and easier. You will also find many objects scattered about in random locations which can be picked up and dropped at will. Some will help you in your quest, others will not. The rest is for you to discover. MERCENARY is, above all else, a game of exploration and discovery. A complete new world has been created for you to explore, so the idea is simply to get out there and get on with it!

To be perectly honest, I had rather mixed feelings about MERCENARY to begin with. Whilst recognising it's technical merits, I couldn't really fathom the game out even in it's initial stages. I was told (by BENSON) to go to a certain location where the Palyars would offer me a job, but I spent literally hours wandering around in circles unable to co-ordinate the directions. And then I discovered how to work the compass properly and everything clicked into place. Now I'm totally hooked on the game. It's brilliant!

So far I've explored the underground complex, traded with the Palyars, double-crossed the Mechanoids and ran off with their leader, and I'm determined to escape from Targ if it's the last thing I do (which it probably will be!). It's worth mentioning here that, as MERCENARY could conceivably play for ever, you can save current gameplay to disk or tape at any time.

I confidently predict that MERCENARY will become an Atari classic in much the same way that Elite has on other micros. Forget all about zapping aliens for once - that's only for 'Sun Readers' anyway! - and enjoy a game that requires logic, cunning, wisdom, imagination and a host of other resources you won't find on the end of an itchy trigger finger. Have you got what it takes to become a MERCENARY?

Footnote: If you do manage to escape from Targ it will be benificial to you in MERCENARY II. It's great to know a follow-up is already planned.

FIGHTER PILOT

Digital Integration
48K disk £12.95
48K cassette £9.95
1 player
Joystick/Keyboard

Already a huge hit on the Spectrum, FIGHTER PILOT from Digital Integration has now been converted to the Atari. Normally, this wouldn't be anything to get excited about - conversions from other computers are usually pretty naff - but the programmers have obviously taken the trouble to delve into the inner workings of the Atari to produce a truly excellent software package.

First a quick word about the 'Lenslock' - a software protection device which comes with the program. Lenslock is a plastic lens which is folded and placed against the TV screen in order to read a security code which you must then authenticate to play the game. As a security device it is quite novel. I found it easy enough to use but if your TV picture is fuzzy or your eyesight less than perfect, you may well experience a few problems. It definitely serves it purpose though as the program is totally useless to anyone without it!

FIGHTER PILOT is a flight-simulator based around the F-15 EAGLE, USAF air-superiority jet-fighter. A colourful 'Options' screen kicks things off and gives you the choice of various game options ranging from Landing Practice or Flight Training right through to Air to Air Combat. Other options such as Crosswinds & Turbulence and Blind Landings help to make the simulation as realistic as possible and you can even change the ratings of the enemy pilots - trainee, squadron leader, instructor or ace - in order to test your combat skills to the limit.

Once into the simulation itself, the top three-quarters of the screen is taken up by the view from the cockpit window with the remaining quarter representing the instrument panel. The panel is clear, well laid out and contains all the instruments you'll need to pilot the plane successfully - airspeed, fuel, thrust, roll, pitch, altitude, flight computer, ammo, etc.

You fly the plane using the joystick but keyboard inputs are required for the more important aspects of flight control. You can even call up a detailed map of the ground terrain by pressing the appropriate key!

In combat mode it's your job to defend four airfields from enemy attack. A target cursor is super-imposed on the screen to help you line up the enemy aircraft, but shooting them down is no pushover. In this simulation the emphasis is on 'Speed' and your jet fighter responds quickly and instantly - sometimes too instantly - to the controls and a delicate touch is needed at all times if you wish to avoid rolling upside down! It takes some getting used to.

The graphics are superb and the whole simulation has a tremendous feeling of both speed and realism. It beats the heck out of all those boring 747 simulators which give the impression that you're at the controls of a flying tortoise and are good only as a cure for chronic insomnia. Once you've flown an F-15 you won't look at a 747 again!!

Inevitably, this program will undergo comparison with Microprose's STRIKE EAGLE as they are similar in concept. STRIKE EAGLE is the slightly more complex of the two but it concentrates more on the combat side of things and is, therefore, more arcade-orientated than FIGHTER PILOT, which is a true flight-simulator in every sense of the word.

Looking at FIGHTER PILOT purely as a flight-simulator alone, there is no question that it is the very best available for the Atari so far (and a good deal cheaper than most of the others). Digital Integration are to be congratulated for getting it right first time. Let's hope there's more to follow.......

THE GOONIES
Datasoft/US Gold
48K cassette £9.95
48K disk £14.95
1/2 players
Joystick(s)

These days software companies are latching onto just about any popular theme to base their products on - films, TV programmes, pop groups even. Anything to make a fast buck, it seems. Some work, others don't. The Yanks get it right nearly every time though and GOONIES (based on the blockbusting Steven Spielberg film of the same name) from Datasoft is no exception.

GOONIES is a platform game of sorts but, like it's predecessor CONAN & the BARBARIANS, each screen requires you to solve a puzzle in order to exit that screen and move onto the next. You get no game instructions either, only a printed 'help' sheet containing pictures of the eight individual screens with eight short verses or rhymes which give you various hints on how to tackle them, but not enough to give the game away entirely.

This may sound pretty routine so far, but what makes GOONIES unique is that you control not one game character, but two! There are seven Goonie characters in all and each makes an appearance at some time or other. There are only two on screen at any one time though and you must make them work together to 'solve' the game screens and help them to reach their ultimate goal - One-Eyed Willy's Pirate Ship (if you've seen the film, this probably makes sense to you!).

You control the characters with a single joystick, using the firebutton to switch from one Goonie to the other. You cannot solve any of the screens without close co-operation between the two characters, so you will have to master the art of quickfire co-ordination or risk getting bogged down on the first screen!

On your journey through the eight screens you will encounter an assortment of nasties such as deadly bats, demonic flying skulls and poisonous slime, but the main problems lie with the puzzles themselves. You'll experience a lot of head-scratching before things finally fall into place - I know I did. On the plus side, once you have solved the puzzles the screens concerned are a cakewalk second time round.

The Goonies go about their work accompanied by a nice little background jingle (from the film itself, I suspect) which can be turned off if you prefer. Graphics are extremely hi-res and obviously a great deal of time and effort have gone into their design. Each screen is drawn in intricate detail, though the use of colour is fairly limited - only red, blue, white and black are used - but this is just a minor criticism of what is an overall work of art. Of course, all this means that the program would not fit into the available memory and, consequently, the eight screens have to be loaded individually even on the cassette version. This sounds like a hassle, but really it isn't. The bulk of the code is contained in the main program and therefore each screen loads quite quickly - about 25 digits on the tape-counter - so don't be put off by this.

As long as Datasoft continue to produce games of this quality they will remain one of the premier independant Atari software companies. GOONIES is a winner all the way!

TAPPER
Sega/US Gold
48K casette £9.95
48K disk £14.95
1/2 players
Joystick

Sega's range of Atari computer games are gradually becoming available in this country thanks to US Gold. TAPPER is one of their new releases and, in this game, you play the part of a frenzied bartender whose job it is to serve a never ending flow of thirsty customers. You guide the bartender between the bartops, pressing the firebutton to 'sling' sodas at the customers. The aim is to knock them back through the doors of the saloon (the customers, that is!) in an effort to clear the bar and progress to the next round of play. You must only serve one soda per customer, otherwise you lose one of your five allotted lives. Sometimes the customers will remain in the saloon and try to catch you out by slinging their empty glasses back at you. If you allow any of these to drop off the end of the bar you also lose a life.

After a set number of rounds you are required to tackle the bonus round. Here, the mysterious Soda Bandit shuffles five out of six soda cans on a solitary bartop and challenges you to choose the only unshaken one. If you guess correctly you gain 3000 bonus points. If you guess wrongly, however, all you get is a face full of soda!

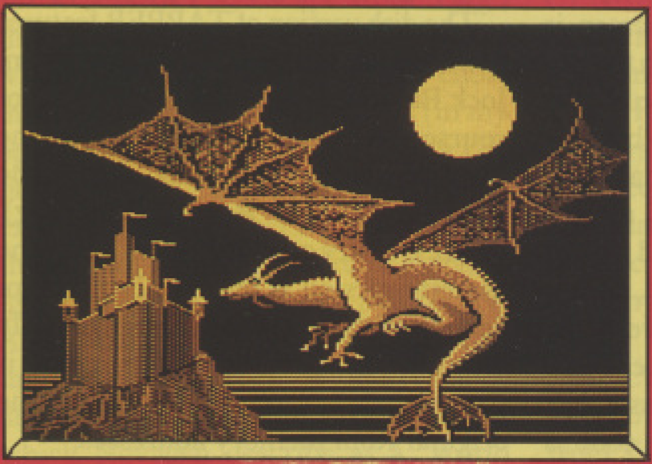
The disk version of TAPPER features five different screens - Old West Saloon, Jock Bar, Punk Bar, Space Bar and, of course, the Bonus Round - but the cassette version has only three (the Punk and Space Bars are missing). There is a very good reason for this. The cassette version is really only the Rom version of the game transferred directly onto tape. In effect it's a 16K game but it still requires 48K as it retains the original Rom memory addresses.

I can thoroughly recommend the disk version of TAPPER. It's ridiculously simple to play and highly addictive into the bargain. The cassette version is okay, but lacks variety. One more thing - do not be fooled by the on-screen photos on the cassette inlay as these come from the arcade game and the graphics shown are much better than any computer version. Sega have gotten into a habit of displaying arcade screenshots on their computer software and I, for one, don't approve. Apart from being misleading, it surely contravenes the Trades Description's Act in some way? ●

Coming...



Atari Art



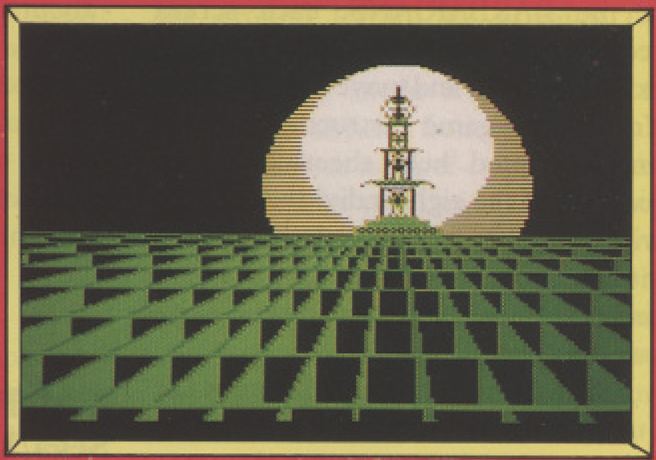
Dragon by Ian Bateman



Dracula by Bryan Cox



Steven by David Encil



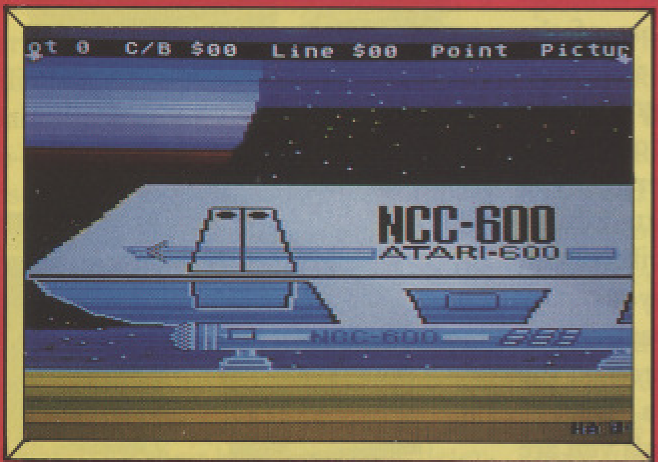
Pagoda by Ian Bateman



Dracula by Ian Bateman



Tiger by Bryan Cox



Shuttle by Harvey Kong Tin

These pictures are a selection of many sent in by readers of PAGE 6. Most were drawn with the Atari Touch Tablet.

AT LAST!

UNCLE JACK'S "POWER WITHOUT THE PRICE" PHILOSOPHY HAS BEEN APPLIED TO SOFTWARE.

AT LAST!

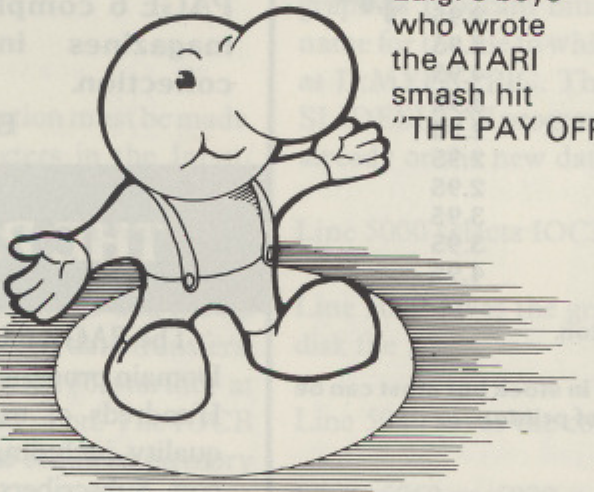
A SOFTWARE COMPANY THAT BRINGS THE PRODUCTS WE NEED .....

COME TO THE 1ST ATARI COMPUTER SHOW & SEE OUR RANGE

STAND 31

WORLD PREMIER
Phantom of the Opera
Stars in our new ADVENTURE CLASSIC
OPERA HOUSE

BIGNOSE SOFTWARE



Meet Bignose
Luigi's boys who wrote the ATARI smash hit "THE PAY OFF"

COME ON DOWN
& bring the family to play
THE FAMILY GAME

ENTERTAINMENT, EDUCATION, BUSINESS AND CREATIVITY. . . .
IT'S ALL FROM

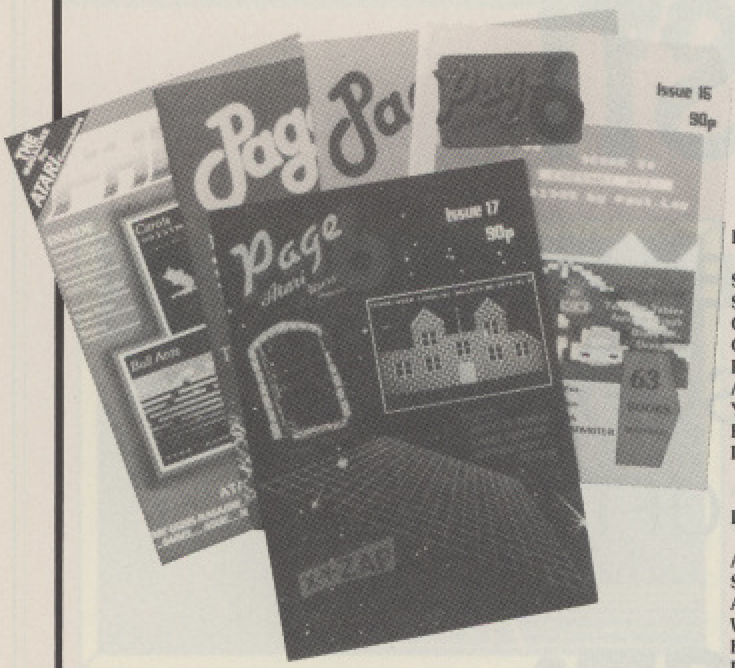
SECS

IT'S WHAT YOUR HARDWARE HAS BEEN WAITING FOR!!!

FABULOUS PRIZES TO BE WON!

TRY YOUR HAND AT SOME OF OUR YET TO BE RELEASED SOFTWARE

DEALERS CALL (021) 328 3585 FOR A DEALER PACK



Back Issues

Issues 1 - 6,8,9,11 SOLD OUT

Issue 7 £1.00 inc. postage
Issues 10 onwards £1.20 inc. postage

Overseas readers please see page 3

You've already missed plenty, don't miss the rest!

Issue 7

Slots
Seasons Greetings
Grubs
Going for a Drive
BUGS
Atari Basic Sourcebook
Your Own Bulletin Board
First Steps
Largeprint

Issue 10 - Adventure Special

Adventureland
Scott Adams Interview
Atari Adventures
When All Else Fails
HOUSE OF SECRETS
Diamonds
Spinner
Screen Colour
... plus the usual features.

Issue 12

Rescue Mission
Gangsters
Varsort 2
Renumber
Indus GT Review
Bookmarks
D-I-Y Disk Box
Hardware Facts
... plus the regular columns

Issue 13

Flight of the Swan
Camelot
Bomb Escape
Bull Ants
Music Maker
1020 Printer Handler
PMG in Machine Code
Music Reviews
Adventure Column ....

Issue 15

The Wanderer
Kanga
Tick Tock
Autocar
THE BOOSTER
Player Missile Graphics
IOCB's
Going Stateside
... reviews and more

Issue 16

Black Box
FREEWAY ACE!
Draughts
Turn The Tables
Autocar Graph
130XE Reviewed
Atariwriter and the 1027
.... 63 books reviewed!

Issue 17

Renum
Shooting Gallery
X-Y-Zap
Inlay Cards
CASTLE MORGUE
Matthew's Label Maker
Antic 4/5 Tutorial
Superscript Review ... and more!

Issue 18 IN SHORT SUPPLY

Bertie
Grand Prix II
Blitz
Lister
Display Lists Tutorial
Mask of The Sun
8-tect Disk Mod
Stars
Lots of reviews

Issue 19

The Chase
Magfile
Sector 10
Display Lists Pt.2
Speech Synthesiser
1985 Review
5 Page ST Section
Adventure Reviews
... and much more!

DUST COVERS

Don't risk a breakdown of you precious equipment through dust or spilt coffee! Protect all of your equipment with a custom made dust cover. Natural PVC with a brown or black trim - easily folded away when your equipment is in use. Easilv fitted with all peripherals, joysticks etc. in place.

New

520ST	4.95
3½" SF354 Disk Drive	2.95
Stacked 3½" Disk Drives (2)	3.95
SM124 Monochrome Monitor	4.95
400/800/600XL/800XL/130XE	3.95
410 Old Style Cassette*	2.95
410 New Style Cassette	2.95
1010 Cassette	2.95
810/1050 Disk Drive	3.95
1020/1027/1029 printers	3.95
Other printers (to order)	4.95

*old style does not have a pause button.

Some popular printer covers are held in stock but most can be obtained to order. Please state type of printer.

DISK INLAY CARDS

Keep track of your programs easily and tidily.

Disk insert cards. Pack of 25.

£1.00 each pack inc. postage.

PAGE 6 BINDERS with FREE index!

NOW AVAILABLE! Superb binders to keep all your copies of PAGE 6 in mint condition. Each binder holds 12 issues securely and safely. For a limited period each binder will come with a comprehensive index to the first 12 issues of PAGE 6 completely FREE! Turn your PAGE 6 magazines into a permanent reference collection.

Binders £4.25 each inc. postage.

THE PAGE 6 LIBRARY

The PAGE 6 LIBRARY is a fine collection of Public Domain programs from around the world on disk only. Hundreds of user written programs of exceptional quality, including many in machine code, at very little cost. Subscribers get full details of new additions each issue. For full details send a large stamped addressed envelope to the address below.

ORDER ALL ITEMS ON THIS PAGE FROM

PAGE 6 MAGAZINE
P.O.BOX 54
STAFFORD
ST16 1DR

Please make cheques/postal orders payable to PAGE 6.

ACCESS accepted.
Mail Order
or Telephone 0785 213928

CIO SLIDESHOW

We all know the quality of Atari computers when it comes to graphics displays but many of the high resolution geometric or graph drawing programs take quite a time to create a screen, and artistic masterpieces are often unrepeatable. It would be useful to store a completed screen for later recall by saving the screen data directly so that the original program is not needed to display the picture again. The recall must be fast if it is to be effective. A high resolution screen (graphics 8) takes 8138 bytes of memory so there is a lot of data to move - for this sort of task Basic is far too slow.

CIO - FAST DATA TRANSFER

I am not a machine code programmer and so was delighted to find that the Atari operating system includes machine routines for the fast transfer of data. These reside in an utility called Central Input/Output (CIO) which is used for all data transfer processes such as program load/save or output to screen or printer. The use of this general purpose device for data transfer routines was well described in Analog Computing No.13 (Sept/Oct 1983), by Richard Groszkiewicz and his article gave clear advice on how to use the CIO from basic. I will restrict this article to the specific use of CIO for screen data dumps to disk and for the SLIDESHOW program which will display a sequence of saved pictures.

IOCBs

Before using CIO utilities some preparation must be made. This consists of setting various parameters in the Input/Output Control Blocks (IOCBs). There are 8 IOCBs of which IOCB #0 is normally used for the screen editor (E:), IOCB #6 is normally used for graphics screen display (S:) and IOCB #7 is normally used for LPRINT, LOAD and SAVE routines. We will use IOCB #1 for our screen data transfers. Each IOCB occupies 16 bytes with IOCB #0 starting at memory location 832, IOCB #1 at 848 and so on. The IOCB can be set up from basic by POKEs to the required memory locations. For our purposes the important memory locations are:

by Ian Finlayson

IOCB+2	Must contain 7 for Get or 11 for Put routines
IOCB+4	Low byte of the starting address in memory from/to which you will transfer data
IOCB+5	High byte of address location
IOCB+8	Low byte of the number of bytes of data you wish to transfer
IOCB+9	High byte of the number of bytes to be transferred.

This will become clearer as we go through the first program.

CIODUMP

The first listing, CIODUMP, is a short program which may be appended to a graphics program to dump the resulting screen data to disk. This data will be in the correct format to be used by the SLIDESHOW program later. A brief description follows:

The first set of REMs are inserted to give a reminder that this program will not work alone. It has to be appended to a program which generates the picture to be saved. The graphics program must dimension a string F$ and give a name for the file to which the picture data will be stored such as D:MYPIC.PIC. The .PIC extender is recognised by the SLIDESHOW program. Choose a file name that is not in use already or the new data will overwrite the old.

Line 5000 selects IOCB #1 and opens it to Put data.

Line 5020 saves the graphics mode of the current screen to disk file F$

Line 5040 saves the colour register values.

Lines 5050 to 5070 work out the start of screen memory (DLIST) and the number of bytes to transfer (NUMBER)

Lines 5090 to 5160 find the starting address of the IOCB. Poke 11 into IOCB+2 (for a Put operation) then split DLIST and NUMBER into high and low bytes and poke the resulting values into the correct IOCB registers.

Line 5170 calls the CIO routine - the short string "h-h-h-inverse *-L-V-inverse d" is a machine code routine which calls CIO.

continued overleaf

```
CS 1 REM ################################
QU 2 REM #         CIO DUMP            #
ZV 3 REM #            by               #
YO 4 REM #      IAN FINLAYSON          #
SG 5 REM # --------------------------- #
XD 6 REM #  PAGE 6 MAGAZINE - ENGLAND  #
CY 7 REM ################################
QB 10 REM ┌─────────────────────────────┐
DY 20 REM | MAIN PROGRAM MUST DIMENSION|
          | F$ BY DIM F$(14) AND GIVE   |
          | IT A VALID FILENAME WITH    |
KW 30 REM | A .PIC EXTENDER FOR USE     |
          | WITH SLIDE SHOW PROGRAM     |
GM 4999 REM * SET UP CHANNEL FOR CIO PUT
          * USING IOCB #1
LT 5000 CH=1:OPEN #CH,8,0,F$
QE 5010 REM * SAVE GRAPHICS MODE
YU 5020 PUT #CH,PEEK(87)
SV 5030 REM * SAVE COLOUR REGISTERS
EM 5040 FOR I=0 TO 8:PUT #CH,PEEK(704+I):
     NEXT I
SN 5050 RAMTOP=PEEK(106)*256
BM 5060 DLIST=PEEK(560)+256*PEEK(561)
VG 5070 NUMBER=RAMTOP-DLIST+1
WE 5080 REM * USE CIO TO PUT BYTES
PT 5090 CH=CH*16
MH 5100 IOCB=832+CH:POKE IOCB+2,11
HD 5110 ADRHI=INT(DLIST/256)
LV 5120 ADRLO=DLIST-ADRHI*256
EE 5130 POKE IOCB+4,ADRLO:POKE IOCB+5,ADR
     HI
CA 5140 NUMHI=INT(NUMBER/256)
VP 5150 NUMLO=NUMBER-256*NUMHI
MR 5160 POKE IOCB+8,NUMLO:POKE IOCB+9,NUM
     HI
ET 5170 I=USR(ADR("hhh*LVd"),CH)
XW 5180 CLOSE #CH/16
```

SLIDESHOW

The second program SLIDESHOW is a program which will display all the picture files on a disk. All that is needed is to ensure that the files have a .PIC extender.

Lines 30 to 60 retrieve all file names with a .PIC extender from the disk and load them into a string B$.

Line 70 branches to 230 if no picture files are found.

Lines 80 to 110 get a file name (A$) from B$ and ensure it is in the right format for use with the OPEN command in Line 20 (ie D:FILE.PIC)

Lines 120 to 210 are very similar to the CIODUMP routine - note the POKE IOCB+2,7 in line 160 for a Get routine.

Line 130 is there to ensure that there is no text window in the display and to allow each picture to overwrite the previous one. If you prefer to switch one picture off before loading the next delete line 132. This is usually better when a disk with several pictures in different graphics modes is being displayed - some odd effects are generated when the graphics mode is changed while the picture data is retained.

Line 220 displays the picture for a short time before returning to 90 for another file. The POKE 77,0 is to stop the display going into attract mode if the program is left to repeat for a long time.

```
CS 1 REM ################################
NG 2 REM #         SLIDE SHOW          #
ZV 3 REM #            by               #
YO 4 REM #      IAN FINLAYSON          #
SG 5 REM # --------------------------- #
XD 6 REM #  PAGE 6 MAGAZINE - ENGLAND  #
CY 7 REM ################################
NN 8 REM
BO 20 DIM F$(14),A$(17),B$(510):Q=256:F$(
   1,2)="D:"
NH 29 REM * OPEN IOCB #2 AND RETRIEVE ALL
        FILES WITH .PIC EXTENDER INTO
        B$
KS 30 TRAP 230:OPEN #2,6,0,"D:*.PIC"
UB 40 Z=0
NO 50 INPUT #2,A$:Z=Z+1:B$(17*Z-16,17*Z)=
   A$:IF A$(5,8)="FREE" THEN 70
SX 60 GOTO 50
KO 70 CLOSE #2:IF Z=1 THEN 230
AD 79 REM * GET A FILE NAME FROM B$
JN 80 Z=0:TRAP 80
MA 90 Z=Z+1:A$=B$(17*Z-16,17*Z)
QU 100 F$(3,14)=A$(3,14):FOR N=4 TO 10:IF
    F$(N,N)=" " THEN F$(N,N+3)=".PIC"
HR 110 NEXT N
XX 119 REM * OPEN IOCB #1
XD 120 CH=1:OPEN #CH,4,0,F$:F$(3,14)="
   "
TP 129 REM * GET GRAPHICS MODE FROM DISC
        FILE THEN GET COLOUR DATA
        AND SET COLOUR REGISTERS
UY 130 GET #CH,GR:IF GR<9 AND GR>0 THEN G
   R=GR+16
WF 132 IF GR<25 THEN GR=GR+32
WE 140 GRAPHICS GR:FOR I=0 TO 8:GET #CH,A
   :POKE (704+I),A:NEXT I
BM 149 REM * SET UP IOCB
PR 150 RAMTOP=PEEK(106)*Q:DLIST=PEEK(560)
   +Q*PEEK(561):NUMBER=RAMTOP-DLIST+1
PD 160 CH=CH*16:IOCB=832+CH:POKE IOCB+2,7
OL 170 ADRHI=INT(DLIST/Q):ADRLO=DLIST-ADR
   HI*Q
KW 180 POKE IOCB+4,ADRLO:POKE IOCB+5,ADRH
   I
CY 190 NUMHI=INT(NUMBER/Q):NUMLO=NUMBER-N
   UMHI*Q
QF 200 POKE IOCB+8,NUMLO:POKE IOCB+9,NUMH
   I
YZ 209 REM * CALL IOCB MACHINE CODE TO
        DISPLAY DATA - PAUSE THEN
        CALL NEXT FILE FROM B$
HU 210 A=USR(ADR("hhh*LVd"),CH):CLOSE #CH
   /16
LM 220 FOR DELAY=1 TO 1000:NEXT DELAY:POK
   E 77,0:GOTO 90
PH 229 REM * WRONG DATA DISC!
EB 230 GRAPHICS 0:? "↖↓↓NO PICTURE FILES
   ON THIS DISK":? "↓↓SELECT PICTURE DATA
    DISC AND RUN AGAIN"
```

MEMORY USE

These programs will handle all graphic modes and even mixed mode screens as the display list is saved as well as the screen data - but you will soon realise that the various modes take up very different amounts of space. The adage that one picture is worth a thousand words is borne out by the relative amounts of data required to store them! The space taken up on a disk by each mode is shown in the table:

Graphic Mode	Disk Sectors
0	9
1	6
2	4
3	4
4	6
5	10
6	18
7	34
8 and over	66

High resolution screens soon fill up a disk but you can give impact to your slideshow by interleaving pages of Graphics 1 or Graphics 2 text. They load very fast and can be used to commentate on the pictures.

FURTHER DEVELOPMENT

There are some obvious enhancements which can be made to these programs which would improve them - for instance how about using a memory saving algorithm to compact the screen memory before saving it, or adding a screen dump so that hard copy of the pictures can be made at any time? I would be pleased to hear from anyone who works out improvements to the programs.

I will send a copy of the programs with a set of demonstration graphics to anyone who sends me a disk and return postage, (and your address clearly written!) and would also like to build up a library of graphics on disk if any of you with stunning displays would send me a copy - I will send your disk back!!

My address is:
Ian Finlayson,
60 Roundstone Crescent,
E.Preston,
W.SUSSEX BN16 1DQ

BULLETIN BOARDS

TIMEZONE

0244 677978

18.30 - 23.30 Weekdays
09.00 - 23.30 Weekends

Sysop: Paul Gaulton
Co-Sysop: Sharon Gaulton

Ring back system. Ring twice, hang up and ring again.

FIRST STEPS

WRITE A GAME

continued

In the first WRITE A GAME article, I had promised to show you how the 'FINISHED' and 'AGAIN?' boxes shown in the algorithm would work. This had to be left out of that article but I will include it now.

When you have set up the introductory display screen, it is best to wait until the user has fully finished reading as it can be annoying to move on to the next screen before you have read the first. However, waiting for user response does break the program flow and 'delay' or 'wait' statements are sometimes best, especially if it is a display tutorial that can be LISTed and analysed later. These delay statements take the form

```
FOR WAIT=1 TO NUMBER: NEXT WAIT
```

where NUMBER is any value that is suitable for your program.

If you do want user response then probably the simplest way is to monitor keyboard response. The following example will correspond to the 'FINISHED' box.

```
100 ? "PRESS ANY KEY TO CONTINUE"
110 POKE 764,255 : REM *** This sets the 'last key pressed' location to a no-key pressed condition.
120 IF PEEK (764)=255 THEN 120 : REM *** Keep looking to see if any key is pressed.
130 ?"THANK YOU" : REM *** PEEK (764) is less than 255, i.e. a key was pressed.
```

To use the 'AGAIN?' box, the computer must be supplied with a specific answer. In this case PEEK (764) will have to be 43 for Y(es) or 35 for N(o). Any other response should send the computer back to look at the keyboard again.

```
100 ? "SAME AGAIN?"
110 POKE 764,255 : REM *** Clear register.
120 IF PEEK(764)=43 THEN GOTO YES : REM *** Subroutine.
130 IF PEEK(764)=35 THEN GOTO NO
140 GOTO 120 : REM *** Look again.
```

Another way to do this is to look directly at the input. As some users tend to input "YES" while others input "Y", it is necessary to look only at the first letter of the input. Thus you need only DIM the string to one character, saving on memory.

```
100 DIM A$(1)
110 INPUT A$
120 IF A$="Y" THEN GOTO YES : REM *** Subroutine.
130 IF A$="N" THEN GOTO NO
140 ? "TRY AGAIN":GOTO 110
```

There are other ways to do this, but these are about the simplest.

Let's go on now to some feedback from the first column. I received a letter from Steven Wayne of Palmers Green. Steven, who does some teaching, told me that I should explain what all the POKEs are for and should use REM's more often. I had hoped that readers would avail themselves of the PAGE 6 offer of 'Mapping the ATARI', but if not then I will gladly run over the listing again.

Line 5010 - POKE 559,0, as described in the text, will switch off the screen and allow the computer to run faster. The screen will also appear fully drawn when switched on again. POKE 710 is one of the colour registers used instead of SETCOLOR.

Line 5015 - POKE 752,1 will turn off the cursor. POKE 559, 34 will turn on the screen.

Line 5040 - again POKE 559,0 to switch off screen. POKE 712,34 another colour register (I have no idea why I also used a SETCOLOR statement here!). POKE 756,226 sets the characters to lower case, and POKE 752,1 to swich off the cursor.

Line 5060 POKE 559,34 - switch on screen.

So much for the first part of the game. This issue I have provided some additional routines in Listing 1 which should be added to the first part of the game in issue 18. I hope that you read the last 'FIRST STEPS' column about LOCATE, as the program makes use of this command. The keyboard entry is looked at (lines 1010 - 1100 and 2010 - 2100) and then compared with the associated screen location. The value of the screen location is then checked to see if it contains 'X' or 'O'. If it does then the choice must be made again. If not, the relevant character is printed in the square. To make life easier, I made the line listings with exactly a 1000 difference (aren't I good to you?). All you need do is change the line number and then X$ to O$ and hit RETURN.

Remember that the program is not complete and will be added to in future issues.

by Mark Hutchinson

Listing 1

```
CU 998 GOTO 998:REM *** Replaces line 999
YJ 999 REM *** Get player #1's choice.
FK 1000 WRONG=0:POKE 764,255:? "}Your cho
   ice ";A$:REM *** Clear 'last key press
   ed' register
OB 1009 REM *** Place X in square.
MI 1010 K=PEEK(764):IF K=255 THEN 1010:RE
   M *** Keep looking.
EU 1020 IF K=63 THEN LOCATE 8,3,N:IF N<>2
   16 THEN IF N<>239 THEN POSITION 8,3:?
   #6;X$:RETURN
LC 1030 IF K=21 THEN LOCATE 10,3,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 10,3:
   ? #6;X$:RETURN
VS 1040 IF K=18 THEN LOCATE 12,3,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 12,3:
   ? #6;X$:RETURN
OU 1050 IF K=58 THEN LOCATE 8,5,N:IF N<>2
   16 THEN IF N<>239 THEN POSITION 8,5:?
   #6;X$:RETURN
UT 1060 IF K=42 THEN LOCATE 10,5,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 10,5:
   ? #6;X$:RETURN
EV 1070 IF K=56 THEN LOCATE 12,5,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 12,5:
   ? #6;X$:RETURN
UC 1080 IF K=61 THEN LOCATE 8,7,N:IF N<>2
   16 THEN IF N<>239 THEN POSITION 8,7:?
   #6;X$:RETURN
FV 1090 IF K=57 THEN LOCATE 10,7,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 10,7:
   ? #6;X$:RETURN
JA 1100 IF K=13 THEN LOCATE 12,7,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 12,7:
   ? #6;X$:RETURN
PI 1110 ? "}CHOICE MUST BE A-H ONLY":FOR
   V=15 TO 0 STEP -0.1:SOUND 0,150,14,V:N
   EXT V:SOUND 0,0,0,0:WRONG=1:RETURN
VT 1999 REM *** Get player #2's choice.
XK 2000 WRONG=0:POKE 764,255:? "}Your cho
   ice ";B$:REM *** Clear register.
HE 2009 REM *** Place O in square.
OP 2010 K=PEEK(764):IF K=255 THEN 2010:RE
   M *** Keep looking.
DD 2020 IF K=63 THEN LOCATE 8,3,N:IF N<>2
   16 THEN IF N<>239 THEN POSITION 8,3:?
   #6;O$:RETURN
IT 2030 IF K=21 THEN LOCATE 10,3,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 10,3:
   ? #6;O$:RETURN
TJ 2040 IF K=18 THEN LOCATE 12,3,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 12,3:
   ? #6;O$:RETURN
ND 2050 IF K=58 THEN LOCATE 8,5,N:IF N<>2
   16 THEN IF N<>239 THEN POSITION 8,5:?
   #6;O$:RETURN
SK 2060 IF K=42 THEN LOCATE 10,5,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 10,5:
   ? #6;O$:RETURN
CM 2070 IF K=56 THEN LOCATE 12,5,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 12,5:
   ? #6;O$:RETURN
SL 2080 IF K=61 THEN LOCATE 8,7,N:IF N<>2
   16 THEN IF N<>239 THEN POSITION 8,7:?
   #6;O$:RETURN
DM 2090 IF K=57 THEN LOCATE 10,7,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 10,7:
   ? #6;O$:RETURN
GR 2100 IF K=13 THEN LOCATE 12,7,N:IF N<>
   216 THEN IF N<>239 THEN POSITION 12,7:
   ? #6;O$:RETURN
JV 2110 ? "}CHOICE MUST BE A-H ONLY":FOR
   V=15 TO 0 STEP -0.1:SOUND 0,150,12,V:N
   EXT V:SOUND 0,0,0,0:WRONG=1:RETURN
```

Listing 2

```
CB 5009 REM New Intro by Cliff Winship
ZB 5010 GRAPHICS 17:POSITION 9,0:? #6;"OX
   O":POSITION 9,1:? #6;"OXO":POKE 709,0:
   POKE 710,138:POKE 752,1
CC 5015 DIM A$(12),B$(12),X$(1),O$(1):CMP
   TR=10000:C=0:CO=C:COUNT=C:X$="X":O$="O
   "
OT 5020 MEM=(PEEK(106)-8)*256:POKE 106,ME
   M/256:FOR I=0 TO 1023:POKE MEM+I,PEEK(
   57344+I):NEXT I
WR 5025 CH=(ASC("@")-32)*8:FOR I=0 TO 7:R
   EAD A:POKE MEM+CH+I,A:NEXT I:CH1=(ASC(
   "@")-32)*8
VL 5030 RESTORE 5035:FOR I=0 TO 7:READ A:
   POKE MEM+CH1+I,A:NEXT I:POKE 756,INT(M
   EM/256)
CE 5035 DATA 0,8,8,28,62,107,73,73
KZ 5040 FOR I=0 TO 7:POSITION I,8:? #6;"
   @":FOR DE=1 TO 25:NEXT DE:NEXT I:FOR P
   =85 TO 176:SOUND 0,P,10,8:NEXT P
EZ 5045 FOR DE=1 TO 50:NEXT DE:POSITION 8
   ,7:? #6;"O":POSITION 8,8:? #6;" ":SOUN
   D 0,60,10,8
KQ 5050 FOR I=19 TO 12 STEP -1:POSITION I
   ,12:? #6;"@ ":FOR DE=1 TO 25:NEXT DE:N
   EXT I
ZG 5055 FOR P=101 TO 10 STEP -1:SOUND 0,P
   ,10,8:NEXT P
FS 5060 FOR DE=1 TO 50:NEXT DE:POSITION 1
   2,11:? #6;"X":POSITION 12,12:? #6;" ":
   SOUND 0,91,10,8
AG 5065 FOR I=19 TO 12 STEP -1:POSITION I
   ,8:? #6;"@ ":FOR DE=1 TO 25:NEXT DE:NE
   XT I
BP 5070 FOR P=85 TO 176:SOUND 0,P,10,8:NE
   XT P
UX 5075 FOR DE=1 TO 50:NEXT DE:POSITION 1
   2,7:? #6;"O":POSITION 12,8:? #6;" ":SO
   UND 0,60,10,8
AO 5080 FOR I=19 TO 10 STEP -1:POSITION I
   ,8:? #6;"@ ":FOR DE=1 TO 25:NEXT DE:NE
   XT I
ZP 5085 FOR P=101 TO 10 STEP -1:SOUND 0,P
   ,10,8:NEXT P
XP 5090 FOR DE=1 TO 50:NEXT DE:POSITION 1
   0,7:? #6;"X":POSITION 10,8:? #6;" ":SO
   UND 0,91,10,8
LW 5095 FOR I=0 TO 7:POSITION I,12:? #6;"
    @":FOR DE=1 TO 25:NEXT DE:NEXT I:FOR
   P=85 TO 176:SOUND 0,P,10,8:NEXT P
SI 5100 FOR DE=1 TO 50:NEXT DE:POSITION 8
   ,11:? #6;"O":POSITION 8,12:? #6;" ":SO
   UND 0,60,10,8
JT 5105 FOR I=0 TO 7:POSITION I,10:? #6;"
    @":FOR DE=1 TO 25:NEXT DE:NEXT I
YC 5110 FOR P=101 TO 10 STEP -1:SOUND 0,P
   ,10,8:NEXT P
HS 5115 FOR DE=1 TO 50:NEXT DE:POSITION 8
   ,9:? #6;"X":POSITION 8,10:? #6;" ":SOU
   ND 0,91,10,8
YN 5120 FOR I=19 TO 10 STEP -1:POSITION I
   ,10:? #6;"@ ":FOR DE=1 TO 25:NEXT DE:N
   EXT I
BW 5125 FOR P=85 TO 176:SOUND 0,P,10,8:NE
   XT P
OE 5130 FOR DE=1 TO 50:NEXT DE:POSITION 1
   0,9:? #6;"O":POSITION 10,10:? #6;" "
CK 5135 SOUND 0,60,10,8:FOR DE=1 TO 200:N
   EXT DE
GD 5137 SOUND 0,0,0,0:COLOR 47:PLOT 11,8:
   PLOT 9,10:FOR RP=1 TO 10:FOR V=15 TO 0
    STEP -1:SOUND 0,50,10,V:NEXT V:NEXT R
   P
GL 5140 POSITION 4,4:? #6;"O":POSITION 3,
   5:? #6;"X":POSITION 2,6:? #6;"O"
QM 5145 POSITION 16,4:? #6;"O":POSITION 1
   7,5:? #6;"X":POSITION 18,6:? #6;"O"
NT 5150 DL=PEEK(560)+PEEK(561)*256:POKE D
   L+23,2:POKE 87,0
ND 5155 TRAP 5155:POSITION 2,9:? "(X) Wha
   t is your name";:INPUT A$
VL 5160 POKE DL+26,2:POKE DL+27,2:POSITIO
   N 6,11:? "(Enter '*' to play computer)
   "
EF 5165 POSITION 2,12:? "(O) Your opponen
   t's name";:INPUT B$
PC 5170 IF B$(1,1)="*" THEN TRAP 40000:CO
   =1
HC 5174 GRAPHICS 2:POKE 559,0:POKE 712,40
   :SETCOLOR 3,4,10:POKE 756,226:POKE 752
   ,1
AQ 5180 POSITION 7,2:? #6;"┌─┬─┬─┐":POSIT
   ION 7,4:? #6;"├─┼─┼─┤":POSITION 7,6:?
   #6;"├─┼─┼─┤"
LB 5185 POSITION 7,8:? #6;"└─┴─┴─┘"
AX 5190 FOR Y=3 TO 7 STEP 2:FOR X=7 TO 13
    STEP 2:POSITION X,Y:? #6;CHR$(124);:C
   =C+1:NEXT X:NEXT Y:C=97
EQ 5195 FOR Y=3 TO 7 STEP 2:FOR X=8 TO 13
    STEP 2:POSITION X,Y:? #6;CHR$(C);:C=C
   +1:NEXT X:NEXT Y:POKE 559,34:RETURN
```

Did any of you try your hand at changing the introductory screen which appeared in the first part of the listing in issue 18? I recieved a letter from Cliff Winship, who went to a lot of trouble to try writing his own introductory program. I tried my hand at augmenting his work so some lines were not in Cliff's original program but I hope, after all his hard efforts, that you type in his program which is Listing 2.

The next issue will look at how we can check to find out if a player has won, and how to tie in this test with the two programs in this issue.

Now for next month's homework. I want some simple subroutines to allow the computer to pick a square (HINT. How about my article in issue 19?) and also to store and check previous choices. I hope that I will not have to write this routine myself. Let's hear from you.

Write to Mark Hutchinson at P.O.BOX 123, BELFAST, BT10 0DB

Contact Extra

DUTCH PEN PAL: I would like to write to Atari Users in the U.K. Please write to me. George van den Eijkel, Diemerkade 13, 1111 AB Diemen, The Netherlands

SNOWBALL/SANDS OF EGYPT/ZORRO: In Snowball, how do you get through the trapdoor and how do you kill the bird? In Sands of Egypt, can anyone tell me where to go from the first screen? In Zorro, how do you get the boot? Please write or phone to Paul Steele, 4, Leaford Walk, Eaton Park, Bucknall, Stoke-on-Trent, Staffs. Tel. 0782 279088

ATARI CLUB OF EDINBURGH: Meets on the first and third Friday of each month. For details contact William McLaren Fleming, 31, Strachan Street, Falkirk, Central Region, Scotland, FK1 5DP

600XL FOR SALE: As new, plus Inside Atari Basic book, joystick, 1010 cassette and several programs. All for £89 postage included or offers for the computer on its own. Aidan Curran, Barran, Blacklion, Co. Cavan, Via Sligo, Eire.

PENPALS WORLDWIDE: I have just started an ST User Group. I am looking for other ST Users to exchange tips and ideas etc. to help the Group. Please write to me. Paul Taylor, 97, Shelley Street, Kingsley, Northampton, NN2 7HZ, England.

ANALOG and ANTIC: Magazines for sale or swap. Contact Simon Greenwood, 46, Cromer Street, Burtonstone Lane, York, YO3 6DQ. Phone 0904 25016 and ask for Simon.

ITALIAN ATARI GROUP: Would like to contact English groups to undertake an initiative of exchanging experience. Please write to Guarino Daniele, Via S.Vincenzo 1, 20123 Milano, Italy.

SPARTADOS/RAMDISK: Does anyone know how to set up a 130XE RAMDISK with SPARTADOS? I have copied the DOS 2.5 RAMDISK.COM to Double Density SpartaDos format but it doesn't work. It would be really nice to have double density AND a ramdisk! Mike Doyle, 24, Parklands Drive, Loughborough, Leics. Phone 0509 267992

PEN PALS WANTED: I would like to make NEW friends all around the world to write to about Atari matters. I have a 800XL and 1050 disk drive. Please write to Fred Weilenman, Domela Nieuwenhuisstraat 21 I, 1069 SK Amsterdam, Netherlands.

FOR SALE: De Re Atari £5. Also Atari Technical Notes (Operating System & Hardware manual) £5. Both in very good condition. Please phone Steve Taylor on 01 851 5942 after 7 p.m. please.

LOGO: Birmingham Schools Atari LOGO project seeks information on how to get a LOGO screen dump to an Epson (or other) printer. All ideas and contacts welcome. Lorraine Boyce, Birmingham Educational Computing Centre (BECC), The Bordesley Centre, Camp Hill, Birmingham, B11 1AR

CONTACT really does work! If you need help or want to get in touch send your notice to PAGE 6 on a seperate sheet of paper headed CONTACT. We will accept any notices except those offering software or copying utilities for sale or exchange.



TEL: 021-643 9100

212 BROAD STREET, BIRMINGHAM B15 1AY



A
FRIENDLY WELCOME
ASSURED
EXPERT ADVICE
ALWAYS AVAILABLE

OPEN MON-SAT
9:30 a.m. - 6:30 p.m.



A COMPREHENSIVE SELECTION OF SOFTWARE ALWAYS IN STOCK

YOU'VE READ THE REST



NOW TRY THE BEST

AS ATARI SPECIALISTS WE OFFER KEENEST PRICES AND LARGE UP TO DATE STOCKS

TRY OUR MAIL ORDER SERVICE GOODS DESPATCHED BY RETURN --- *NO WAITING*